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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

WIND MEASURING SET AN/MMQ-1A

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No. 11–2420A

DEPARTMENT OF THE ARMY
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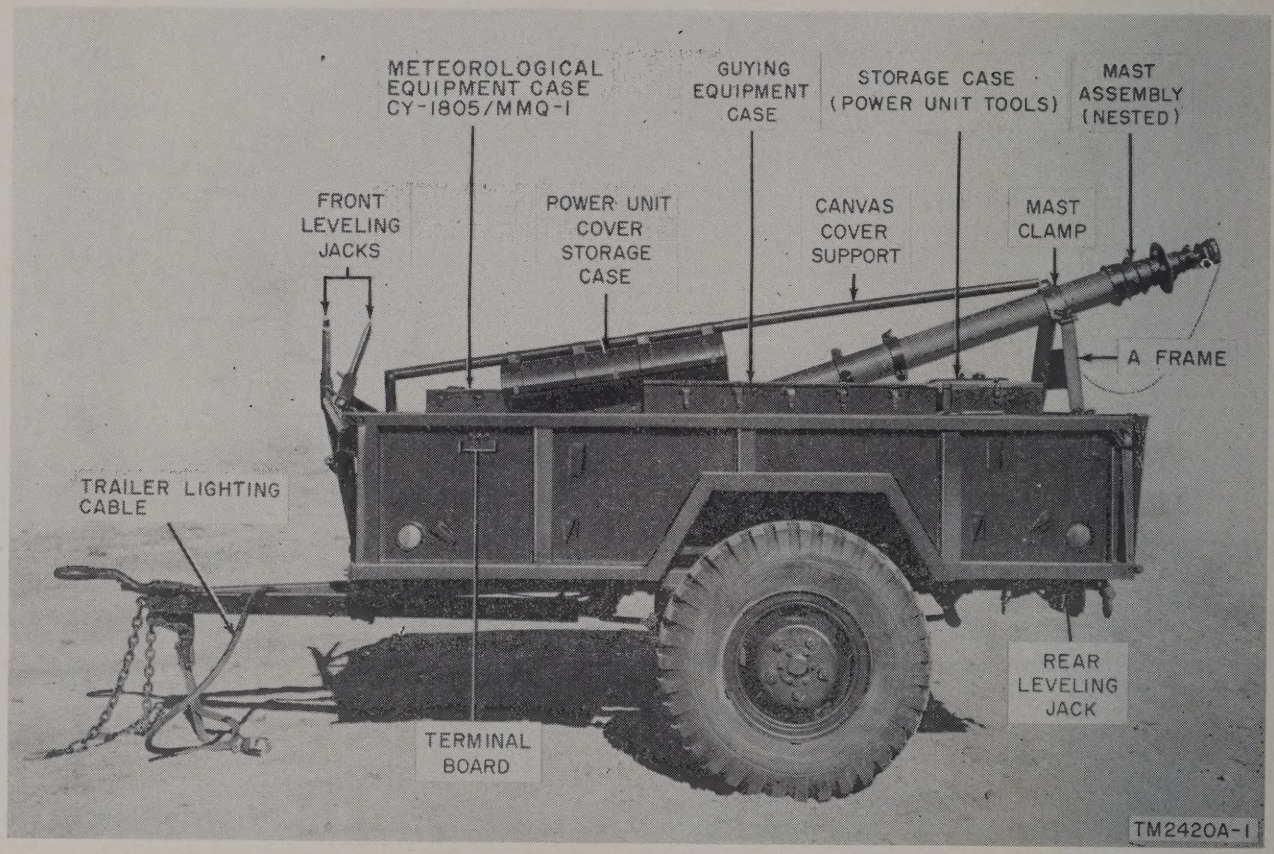


Figure 1. Wind Measuring Set AN/MMQ–1A, canvas cover removed.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual contains instructions for the installation, operation, maintenance, and repair of Wind Measuring Set AN/MMQ–1A (fig. 1).

b. Forward comments on this manual direct to Commanding Officer, The Signal Corps Publications Agency, Fort Monmouth, N.J.

2. Forms and Records

a. Unsatisfactory Equipment Report. Fill out and forward DA Form 468 (Unsatisfactory Equipment Report), to Commanding Officer, Signal Equipment Support Agency, Fort Monmouth, N.J., as prescribed in AR 700–38.

b. Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment), as prescribed in AR 700–58 (Army); Navy Shipping Guide, Article 1850–4 (Navy); and AFR 71–4 (Air Force).

Section II. DESCRIPTION AND DATA

3. Purpose and Use

Wind Measuring Set AN/MMQ–1A transmits and automatically measures azimuth and elevation indications. An indicator is calibrated to convert these indications to corrections in mils for surface winds of 0 to 50 miles per hour. The indicator is located where the data is required, at a distance from the wind speed transmitter not exceeding 1 mile.

4. Technical Characteristics

a. General.

Power requirements:	
Ac operation	115 v 60 cycles (Power Unit PE–75–AF).
Dc operation	24 v (towing vehicle battery).
Wind speed	50 miles per hour maximum.
Range	1 mile maximum between wind speed transmitter and indicator.
Waterfording	Immersionproof to 54 inches.

b. Mast AB–329A/G.

Extended length	50 feet, 1 inch.
Retracted length	9 feet.
Oil tank:	
Capacity	30 gallons.
Maximum operating level	27½ gallons.
Minimum operating level	24 gallons.
Oil weight (normal)	SAE 10.

c. Wind Speed Transmitter T–610/MMQ–1A.

Output	6 v dc (no load voltage at 1,000 rpm.
Wind vane range	0° to 360°.

d. Azimuth and Elevation Correction Data Indicator ID–415A/MMQ–1.

Azimuth correction meter range (mils):	
Outer scale	285–0–285.
Inner scale	142–1/2–0–142–1/2.
Elevation correction meter range (mils):	
Outer scale	150–0–150.
Inner scale	75–0–75.

5. Common Names

A list of the common name assignments for the components of Wind Measuring Set AN/MMQ–1A is given below. A common name is indicated after each nomenclatured item.

Nomenclature	*Common name*
Azimuth and Elevation Correction Data Indicator ID–415A/MMQ–1.	Indicator
Power Unit PE–75–AF	Power Unit
Trailer M–101 (modified)	Trailer
Trailer Mounted Mast AB–328A/M.	Trailer mounted mast
Mast AB–329A/G	Mast assembly
Meteorological Equipment Case CY–1805/MMQ–1.	Case CY–1805/MMQ–1
Wind Measuring Set AN/MMQ–1A.	Wind measuring set
Wind Speed Transmitter T–610/MMQ–1A.	Wind speed transmitter
Wire Dispenser MX–306A/G	Wire dispenser

6. Components

Component	Required No.	Height (in.)	Depth (in.)	Length (in.)
Azimuth and Elevation Correction Data Indicator ID–415A/MMQ–1	1	8.5	17	16
Indicator Case CY–1806/MMQ–1	1	20	20	12
Meteorologcial Equipment Case CY–1805/MMQ–1	1	18	11½	41
Wind Speed Transmitter T–610/MMQ–1A	1	24	15	34
Signal transmission cable	———	———	———	720
Plumb bob (alinement tool)	1	.5	.5	3
Balance weight (tail vane)	1	.050	.5	.5
Balance weight (impeller)	1	.050	1	1
Adapter (mast mounting for wind speed transmitter)	1	1.5	3.5	3.5
Adapter cap and chain	1	1.5	4	4
Junction box	1	2.5	3	5
Trailer Mounted Mast AB–328A/M, consisting of:	1	74	76	160
1 Trailer M–101 (modified)	———	48	76	134
1 oil level gage	———	.5	2	14
1 sledge hammer (8 pound)				
1 tube Dow Corning compound No. 4	———	3.5	3.5	16
2 flexible nozzles				
3 jack pads	———	3.5	10	10
2 jack handles	———	1.5	1.5	13
2 driving caps	———	3	2	2
5 guy stakes	———	36	1.5	8
8 T-hooks	———	1	2	3.5
3 guys (66 ft, tagged 59 ft)	———	———	———	792
3 guys (80 ft, tagged 73 ft)	———	———	———	860
6 guy adapter assemblies	———	10	4	8
1 canvas cover	———	26	72	136
1 canvas cover support	———	6	1.5	96
1 fire extinguisher				
2 5-gal drums				
1 Power Unit PE–75–AF	———	24	20	36
1 power unit waterproof cover	———	16	23	38
1 storage case for power unit cover	———	9.5	8.5	32
1 pan for waterproofing power unit	———	8	23	38
1 guying equipment case	———	10½	10	37
1 tool case	———	11	10½	15½
1 truss and jack, roadside	———	18	2	46
1 truss and jack, curbside	———	18	2	46
1 rear jack	———	21	6.5	12
1 oil tank	———	12	16.5	42
1 hose (pressure relief valve to tank)	———	———	———	8
1 A-frame	———	37	3	43
1 Mast AB–329A/G, consisting of:				

Component	Required No.	Height (in.)	Depth (in.)	Length (in.)
1 mast assembly		109	12	18
1 pump and motor box containing:		15	20	22
1 ac motor				
1 dc motor and controlling relay				
2 oil pumps				
1 control box				
2 light boxes				
1 hose (tank to pump)				96
1 hose (pump to mast)				96
1 cable (2-conductor, control box to Power Unit PE–75–AF)				125
1 cable (5-conductor, control box to ac motor)				132
1 cable (4-conductor, control box to dc motor)				156
1 cable (4-conductor, control box to left light box)				72
1 cable (4-conductor, control box to right light box)				72
1 cable (2-conductor, control box to pump and motor box terminal board).				144
1 cable (2-conductor, terminal board to 24-v battery)				264
1 Screwdriver TL–358/U				
1 10-inch pipe wrench				
1 ¾ by $\frac{9}{16}$-inch open end wrench				
1 10-inch adjustable crescent wrench				
1 ⅜-inch allen wrench				
1 ⅝-inch allen wrench				
1 Tool Equipment TE–33				
Running spares (par. 8)	1 set			

Note. This list is for general information only. See appropriate supply Manuals for information pertaining to requisition of spare parts. Refer to paragraph 9 for a list of additional equipment required, but not supplied.

7. Description of Wind Measuring Set AN/MMQ–1A

The wind measuring set consists essentially of a hydraulically operated mast, a wind speed transmitter, and an indicator. The equipment is mounted on modified Trailer M–101. A canvas cover incloses the trailer and that portion of the mast that overhangs the trailer when the wind measuring set is in the transport condition.

a. Trailer Mounted Mast AB–328A/M. All components (par. 6) of the wind measuring set are located in the trailer component (fig. 1). Front and rear leveling jacks are bolted to the trailer. Cases are installed within the trailer. Mast AB–329A/G, part of Trailer Mounted Mast AB–328A/M, includes a 7-section telescopic mast assembly and the hydraulic and electrical equipment necessary for operating the mast. The mast assembly is mounted on the floor of the trailer and secured during transportation to an A-frame.

b. Wind Speed Transmitter T–610/MMQ–1A (fig. 2). The wind speed transmitter consists of a generator, 6-bladed impeller, weighted tail vane, sine-cosine potentiometer, and mast and cable connectors. The generator and sine-cosine potentiometer are located inside the wind speed transmitter.

c. Azimuth and Elevation Correction Data Indicator ID–415A/MMQ–1 (fig. 3). The indicator is inclosed in a hinged covered case. The hinged main panel contains switches, binding posts, potentiometers, and meters. A raised panel contains meter cutouts, potentiometer cutouts, switch knobs, and potentiometer knobs.

8. Running Spares

The lists in *a* through *c* below are for general information only. See appropriate supply manuals for information pertaining to allowable spare parts.

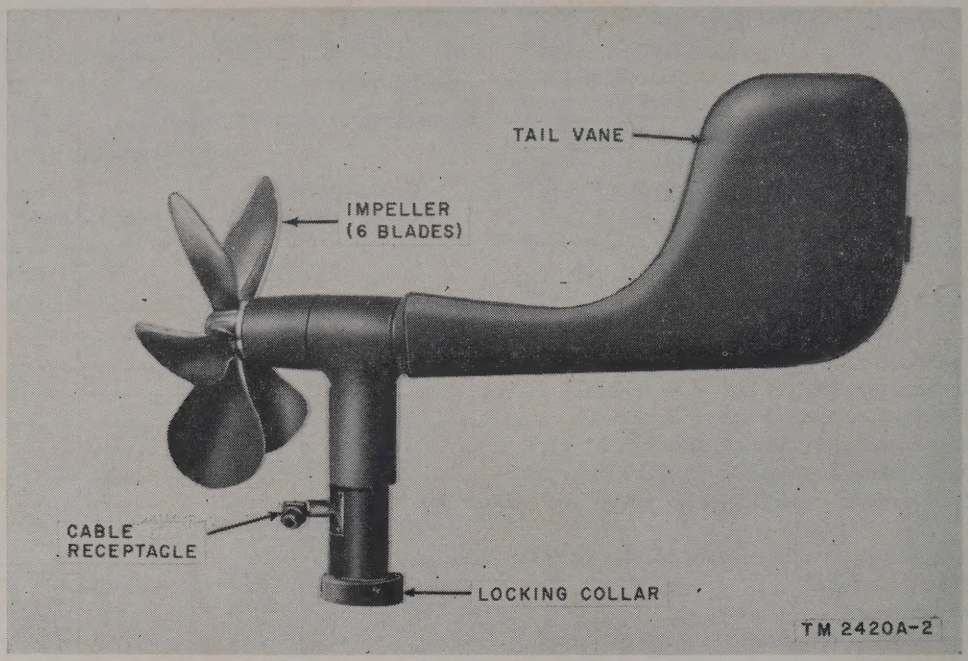


Figure 2. Wind Speed Transmitter T–610/MMQ–1A.

a. Mast AB–329A/G.

Quantity	Item	Stored in
2 sets	Oil seals (6 sizes)	Tool case
2 sets	Oil seal expander springs (6 sizes).	Tool case
1	Hose for hydraulic system (8 ft).	Guying equipment case.
2	T-hooks	Guying equipment case.

b. Wind Speed Transmitter T–610/MMQ–1A.

Quantity	Item	Stored in
1	Impeller	Case CY–1805/MMQ–1
1	Rubber nose cap	Case CY–1805/MMQ–1
1	Tail vane	Case CY–1805/MMQ–1

c. Azimuth and Elevation Correction Data Indicator ID–415A/MMQ–1.

Quantity	Item	Stored in
2	Batteries BA–404/U	Case CY–1805/MMQ–1
2	Batteries BA–416/U	Case CY–1805/MMQ–1
2	Panel-type lamps, G. E. No. 49.	Case CY–1805/MMQ–1
2	Electron tubes, type 6088.	Case CY–1805/MMQ–1

9. Additional Equipment Required

The following chart lists the equipment not supplied as part of Wind Measuring Set AN/MMQ–1A but required for its installation and operation:

Quantity	Description
6	Wire Dispensers MX–306A/G, containing ½-mile Wire WD–1/TT each.
1	Towing vehicle.
2	Field telephones.

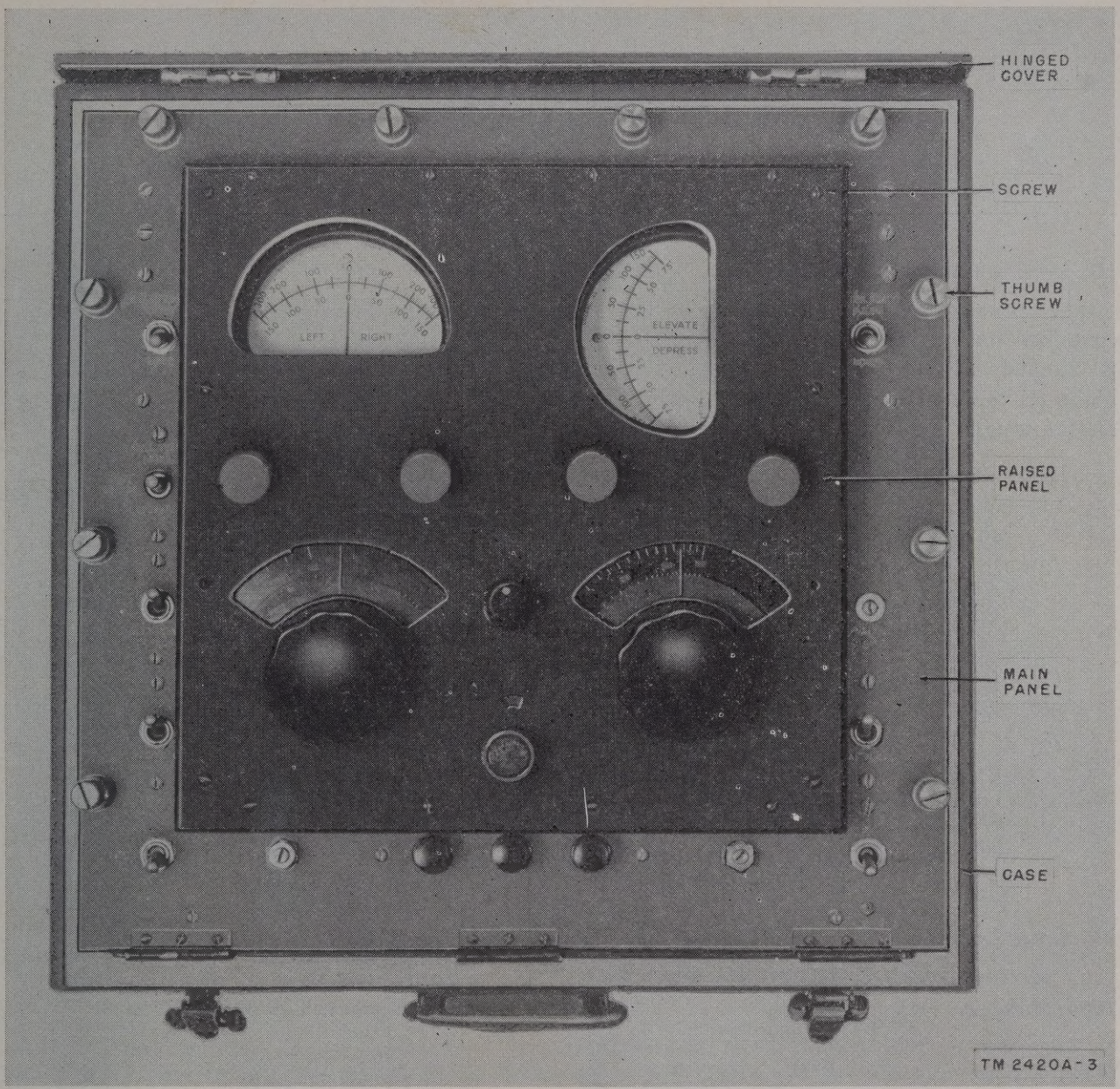


Figure 3. Azimuth and Elevation Correction Data Indicator ID–415A/MMQ–1, cover removed.

CHAPTER 2
INSTALLATION

10. Unpacking and Checking

a. Packaging. The wind measuring set is self-contained for original shipment. The unit is approximately 12 feet long, 6 feet wide, and 8 feet high. Its volume is approximately 576 cubic feet and its weight is about 2,900 pounds.

b. Unpacking.

(1) Upon receipt of equipment, remove the canvas cover from the trailer.

(2) Cut and remove the metal straps that bind the cases.

c. Checking.

(1) Check the exposed components and cases (fig. 4) against the packing list.

(2) Check the contents of each case (par. 11) against the packing list.

(3) Carefully examine all parts for damage that might have occurred during shipment.

11. Case Contents

a. Meteorological Equipment Case CY–1805/MMQ–1.

Quantity	Item
1	Wind Speed Transmitter T–610/MMQ–1A, less impeller and rubber nose cap.
2	Impellers (1 spare)
2	Rubber nose caps (1 spare)
1	Signal transmission cable (60 feet)
1	Tail vane (spare)
1	Balance weight for tail vane (1-inch diameter)
1	Balance weight for impeller (½-inch diameter).
1	Plumb bob (alining tool)
2	Batteries BA–404/U (spares)
2	Batteries BA–416/U (spares)
2	Panel type lamp G.E. No. 49 (spares)
2	Electron tubes type 6088 (spares)

b. Guying Equipment Case.

Quantity	Item
1	Sledge hammer
2	Driving caps
6	Ground stakes
8	T-hooks (2 spares)
6	Reel and guy adjusting assemblies
3	Guys (59 feet)
3	Guys (73 feet)
2	Flexible nozzles for 5-gallon containers
2	Front leveling jack handles
1	Hose (8 feet, spare)

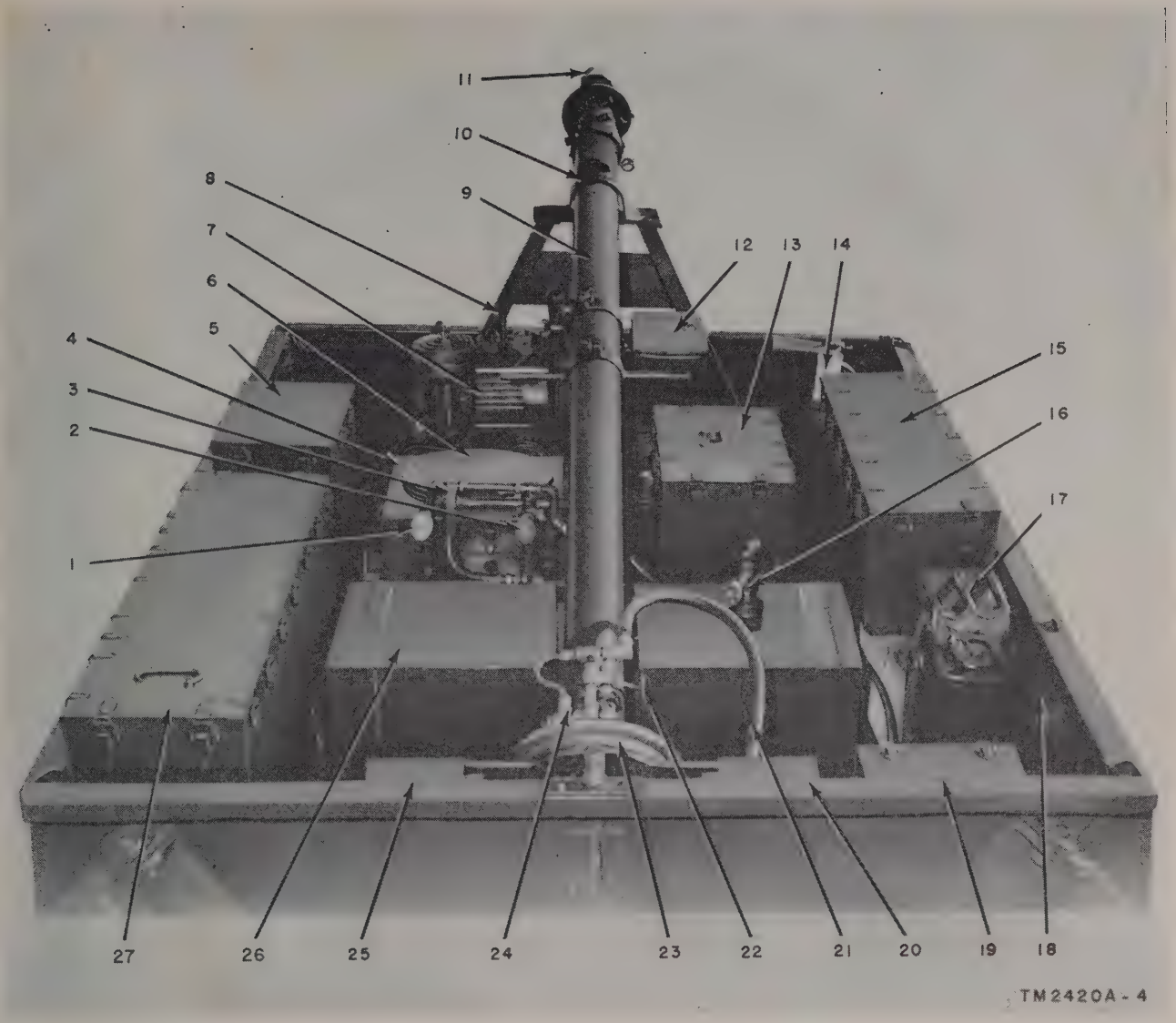
c. Tool Case.

Quantity	Item
2 sets	Oil seals (6 sizes, spares)
2 sets	Oil seal expander springs (6 sizes, spares)
1	Oil level gage
1	Screwdriver TL–358/U
1	10-inch pipe wrench
1	¾ by $\frac{9}{16}$-inch open end wrench
1	10-inch adjustable crescent wrench
1	⅜-inch Allen wrench
1	⅝-inch Allen wrench
1	Tool Equipment TE–33, consisting of: 1 Pouch CS–34 1 knife TL–29 1 Pliers TL–13–A
1 tube	Dow Corning Compound No. 4
2	TM 9–874A, ¾-ton 2-Wheel Cargo Trailer M–101.
2	LO 9874A

d. Indicator Case CY–8106/MMQ–1. Azimuth and Elevation Correction Data Indicator ID–415A/MMQ is the only item stored in this case.

12. Locating

a. The location of the trailer is basically determined by the speed and direction of the wind at the indicator. The best location depends on the following considerations:



1 Oil control valve (red).
2 Oil control valve (yellow).
3 Pressure relief valve.
4 Motor and pump box.
5 Storage case (miscellaneous tools).
6 Dc cable reel.
7 Power Unit PE–75–AF.
8 A-frame.
9 Mast (stationary section).
10 Mast clamp.
11 Protective cap
12 Storage case (power unit tools).
13 Indicator Case CY–1806/MMQ–1.
14 Fire extinguisher.
15 Guying equipment case.
16 Filler cap and oil tank vent valve (green).
17 Gasoline container (5-gallon).
18 Terminal box.
19 Control box.
20 Light box.
21 Oil hose
22 Oil shut-off valve (blue).
23 Mast base (hinged).
24 Mast pressure relief valve.
25 Light box.
26 Oil tank.
27 Meteorological Equipment Case CY–1805/MMQ–1.

Figure 4. Wind Measuring Set AN/MMQ–1A, identification illustration.

(1) The wind pattern at the trailer should be similar to the wind pattern at the indicator.

(2) Locate the trailer up wind at a distance from the indicator equal to the distance the wind covers in 1 minute or ¼ mile per 15-mile-per-hour wind. This distance cannot exceed 1 mile.

(3) Locate the trailer in a clear area with a radius of about 50 feet so that the mast may be properly guyed.

b. Two stakes driven into the ground at a

predetermined location will mark the location of the trailer (par. 17). The stakes will have been designated as trailer stake and aiming stake. Center the trailer over the trailer stake (fig. 9) facing the aiming stake. Position the trailer so that the mast is over the trailer stake, within a 12-inch radius.

13. Securing Trailer

Caution: To prevent any difficulty or damage to the equipment during installation of the wind measuring set, the procedures given in paragraphs 13 through 17 must be followed in numerical sequence.

a. General (fig. 8).

(1) Lower the front support leg and lock it in the lowered position.

(2) Disconnect the trailer lighting cable from the towing vehicle.

(3) Disconnect the lunette of the drawbar from the pintle hook of the towing vehicle and disengage the safety chains.

(4) Secure the parking brakes by operating both wheel brake handles.

(5) Remove the canvas cover from the trailer.

b. Rear Leveling Jack (fig. 5).

(1) Remove a jack pad from the retaining bracket on the inner wall of the trailer.

(2) Unfasten and lower the rear leveling jack from the transporting position.

(3) Lock the rear leveling jack in the lowered position by inserting the locking pin through the three holes.

(4) Place the jack pad beneath the rear leveling jack.

(5) Turn the jack handle clockwise until the ball of the leveling jack is seated in the socket of the jack pad.

c. Front Leveling Jacks (fig. 8).

(1) Remove the two remaining jack pads from the retaining brackets on the inner wall of the trailer.

(2) Unhook the front leveling jacks securing chain.

(3) Pull out the two locking pins that secure the front leveling jacks (one located in each lower corner on the front of the trailer).

(4) Lower the front leveling jacks and lock them in position by replacing the locking pins.

(5) Place one jack pad beneath each front leveling jack.

(6) Remove the two jack handles from the tool box and place one on each front leveling jack.

(7) Lower each jack by turning the jack handle clockwise until the ball of the jack is seated in the socket of the jack pad.

14. Installing Wind Speed Transmitter T–610/MMQ–1A (fig. 6)

The wind speed transmitter is a precision instrument. Handle it carefully. Do not attempt to bend or adjust the blades on the impeller.

a. Assembling. The components of the wind speed transmitter are in case CY–1805/MMQ–1.

(1) Release the wind speed transmitter from the base of case CY–1805/MMQ–1 by unscrewing the locking collar. Remove the wind speed transmitter from case CY–1805/MMQ–1.

(2) Remove the rubber nose cap from one of the impellers and release the impeller from its mounting in case CY–1805/MMQ–1 by loosening its captive thumb nut. Remove the impeller from case CY–1805/MMQ–1.

(3) Place the impeller on the shaft extension of the wind speed transmitter, lining up the three pins on the shaft extension with the three mating holes on the impeller hub.

(4) Place the captive thumb nut on the screw that extends through the impeller hub. Turn the thumb nut until it is fingertight.

(5) Replace the impeller rubber nose cap on the impeller.

b. Mounting on Mast. When mounting the wind speed transmitter on the mast, support the weight of the wind speed transmitter in one hand until the locking collar has been tightened ((3) below).

(1) Remove the protective cap from the mast adapter.

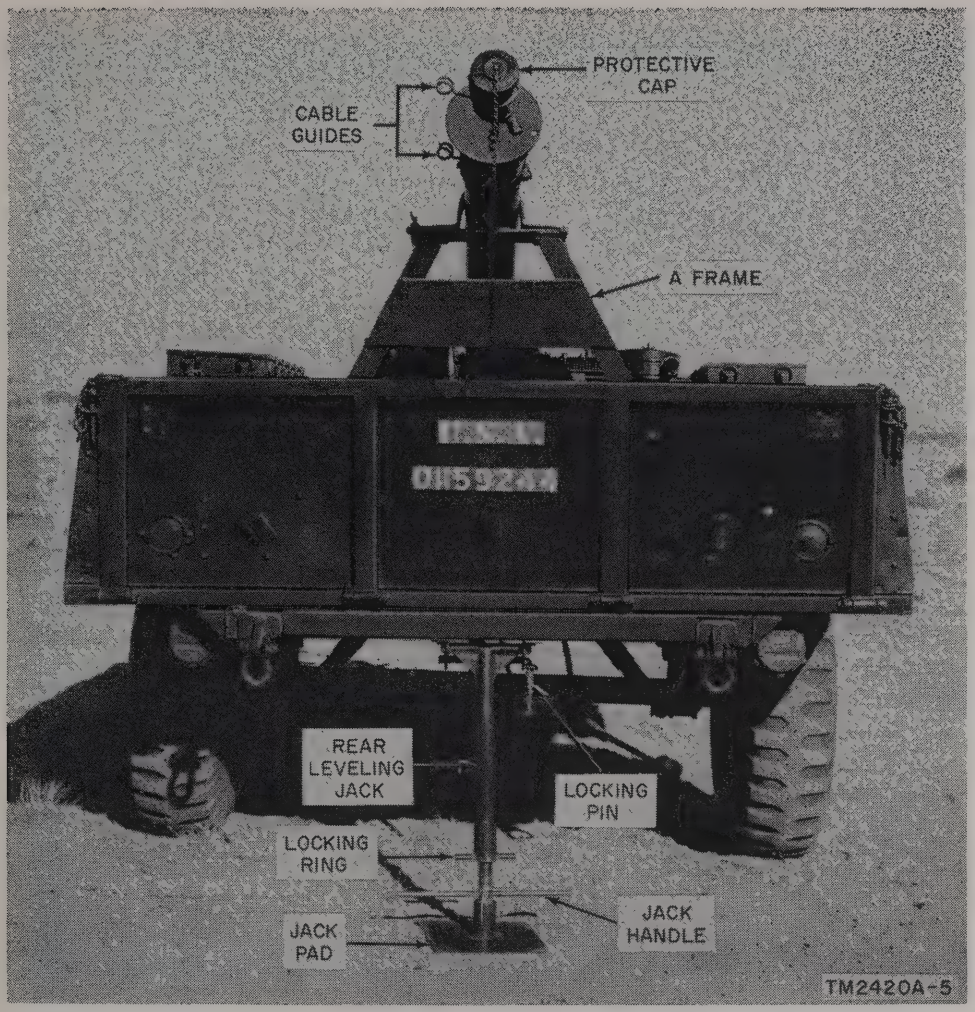


Figure 5. Rear leveling jack.

(2) Position the wind speed transmitter on the mast adapter so that the guide pin on the wind speed transmitter mates with the hole in the mast adapter.

(3) Turn the locking collar clockwise until it engages the mast adapter. Tighten the locking collar until the wind speed transmitter is secured in place.

c. Connecting Signal Transmission Cable to Wind Speed Transmitter. The signal transmission cable is also located in case CY–1805/MMQ–1.

(1) Remove the signal transmission cable from case CY–1805/MMQ–1.

(2) Plug the male end of the signal transmission cable into the cable receptacle on the wind speed transmitter. Secure the connector in place with the fastening sleeve.

(3) Insert the signal transmission cable into the two cable guides on the mast sections. Be sure the cable is free to slide through the spiral cable guides when the mast is extended.

Note. The other end of the signal transmission cable will be connected after the mast is extended (par. 30*c*).

15. Raising Mast to Upright Position

Two men are required to lift the mast to the upright position (*e* below). When raising the mast, use the mast rotating handle (fig. 8) and grasp the body of the mast. *Do not use the peep sight as a handle.* Do not release the mast when it is raised until the mast base plate has been secured (*f* below).

a. Remove the canvas cover support (fig. 1) by lifting the forward end vertically and then

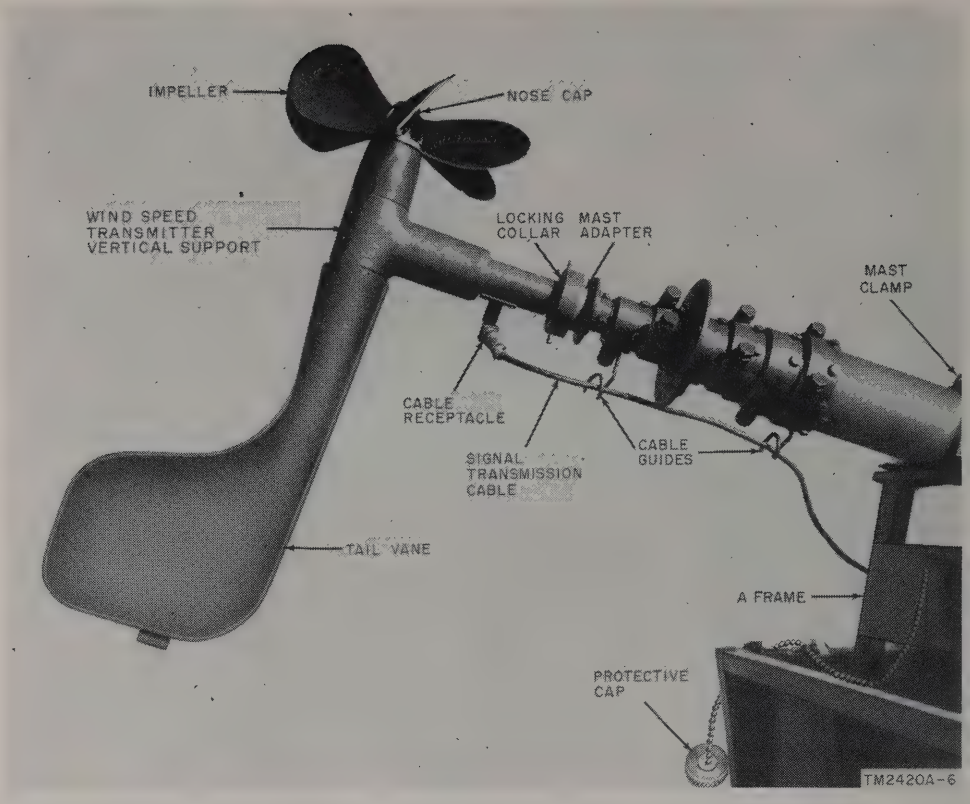


Figure 6. Wind Speed Transmitter T–610/MMQ–1, mounted on mast.

sliding the rear end from the A-frame mast clamp. Place the support under the trailer.

b. Loosen the wingnut that secures the mast clamp to the A-frame. Raise the clamp.

c. Loosen the two wing nuts attached to the trailer mast base plate eyebolts (fig. 7) and lay them flat.

d. See that the four wingbolts inside the mil scale on the mast base are tight. The mast will not turn when it is being lifted to the upright position if these bolts are tight.

e. Raise the mast to the upright position.

f. Fasten the hinged mast base plate to the trailer mast base plate with the two wingnuts on the eyebolts.

16. Leveling Trailer

a. If the two levels at the base of the mast (fig. 7) are not parallel with the front and side of the trailer, respectively, loosen the four wing bolts inside the mil scale on the mast base. Turn the mast until one level is parallel with the front and the other level is parallel with the side of the trailer.

b. Secure the mast in place with the four wingbolts.

c. Slide the level protective caps off the faces of the levels.

d. Adjust the leveling jacks (front and rear) until the air bubbles are centered in the levels.

e. Secure the trailer in its leveled position with the locking rings on the leveling jacks (fig. 8).

f. Slide the level protective caps over the faces of the levels.

17. Orientation of Mast AB–329A/G

The mast must be oriented exactly as directed by information supplied from the indicator location. The position of the trailer stake and aiming stake will have been determined from this information. The aiming stake will have been located approximately 150 feet from the trailer stake. To orient the mast proceed as follows:

a. Loosen the four wingbolts (fig. 7) at the mast base plate. This permits the mast assembly to be easily rotated.

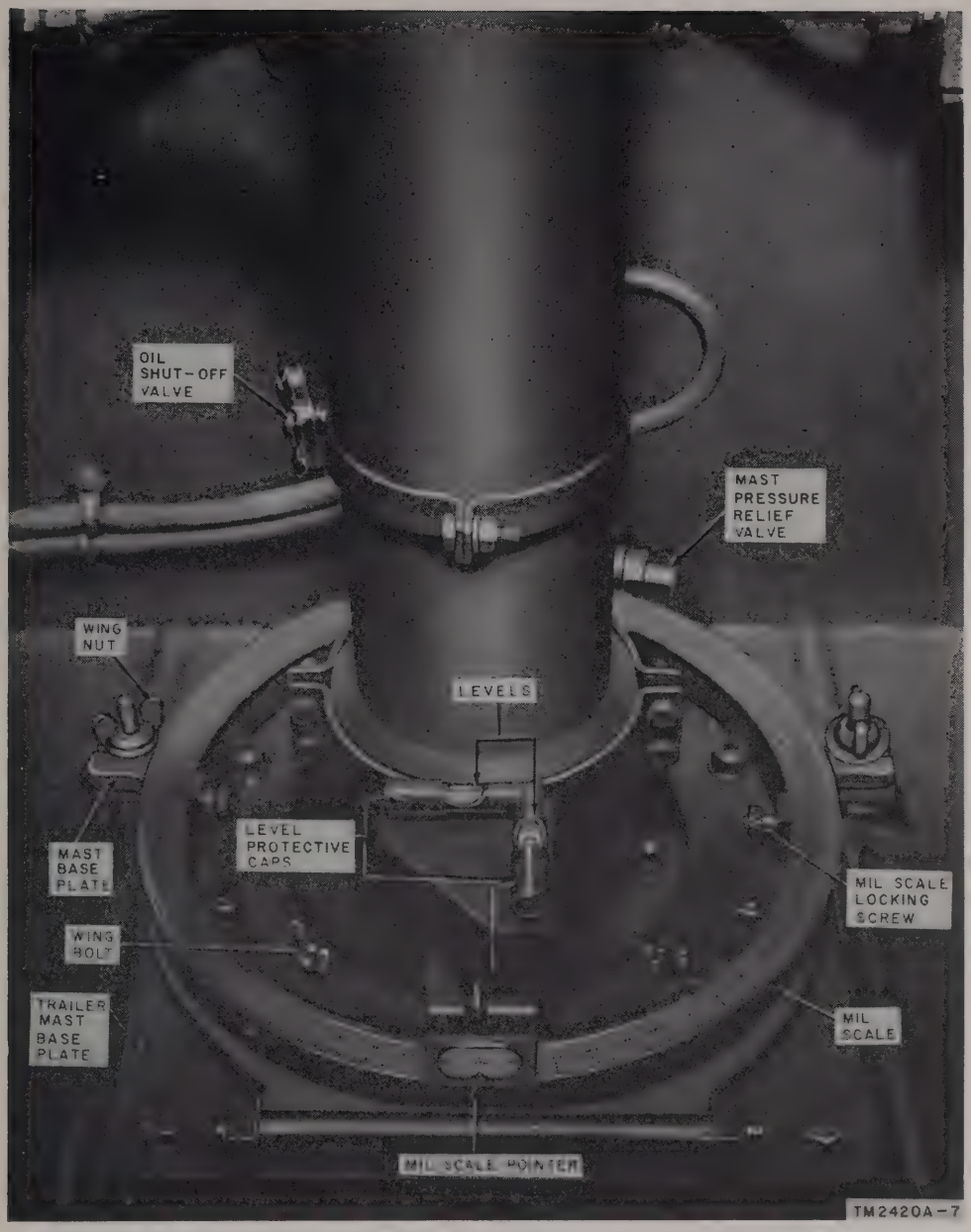


Figure 7. Base of mast assembly.

b. Grasp the rotating handle (fig. 8), look through the peep sight, and rotate the mast assembly until the vertical cross hair in the peep sight is directly in line with the aiming stake.

Caution: Do not attempt to rotate the peep sight in azimuth in relation to the mast. If necessary, the peep sight may be adjusted in elevation as required by positioning it, using the securing wingnut.

c. Tighten the four wing bolts. This locks the mast in place and prevents it from being accidently rotated.

d. Loosen the mil scale locking screws (fig. 7). Rotate the mil scale until the 0 position is beneath the tip of the mil scale pointer.

e. Lock the mil scale in position by tightening the mil scale locking screws.

f. If the aiming stake is true north from the trailer stake and the mast is to be oriented a certain number of mils from the true north, repeat *a* above. Then, rotate the mast assembly

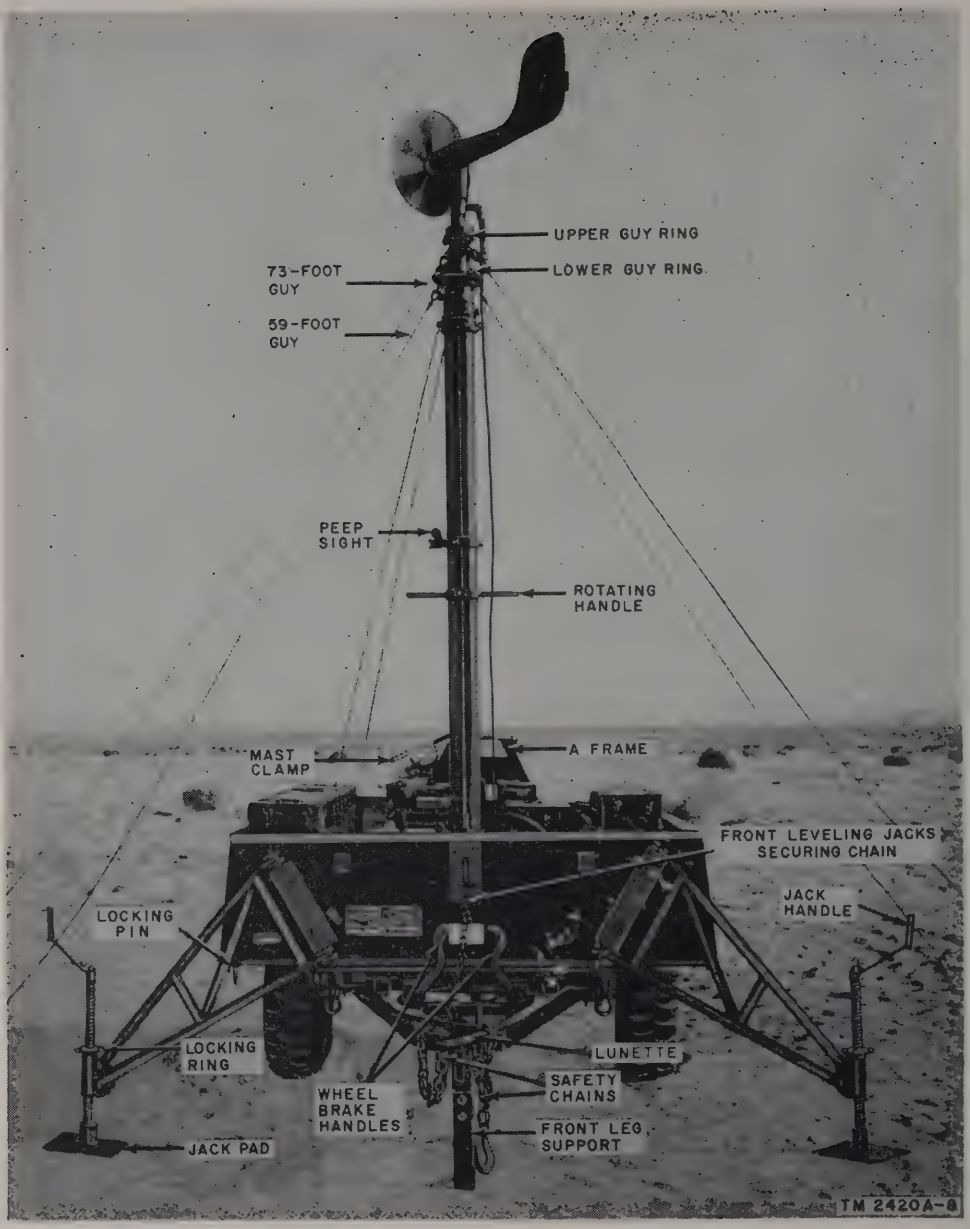


Figure 8. Wind Measuring Set AN/MMQ–1A, mast raised but not extended.

so that the mil scale pointer corresponds to the same number of mils as directed by the orienting information supplied. Retighten the four wing bolts.

18. Guying Mast

Determine the wind speed. If the wind speed is 20 miles per hour or more, guy the mast. If the wind speed is less than 20 miles per hour, it is not necessary to guy the mast.

a. Installing Stakes (figs. 9 and 10).

(1) Remove the six guy stakes, six T-hooks, two driving caps, and the sledge hammer from the guying equipment case.

(2) Mark three stake locations approximately 50 feet (16 paces) from the trailer and 120° apart.

(3) Place two stakes and two T-hooks at each stake location.

(4) Place a driving cap on each stake.

(5) Drive each stake into the ground at an angle away from the trailer with the triangular plate (riveted to the stake)

facing the trailer. Drive each stake until the triangular plate is below the ground.

Note. If the ground is very hard, drive the stake as deep as possible and use the hole below the triangular plate in the stake when attaching the T-hook.

(6) To relocate a stake, loosen it by hitting the sides with the sledge hammer. Remove the stake with an upward pull.

b. Attaching Guys to Mast. Two men are required to attach the guys to the guy rings on the mast (fig. 8). One man should stand on the rotating handle and hook the guys on the guy rings; the other man should hand up the hook ends of the guys.

(1) Remove the six guy adjuster assemblies (fig. 9) from the guying equipment case.

(2) Unreel about 20 feet of slack from each guy storage reel.

(3) Hook the three guys tagged 73 feet (marked with red paint at the swivel) to the upper guy ring (fig. 8).

(4) Hook the three guys tagged 59 feet (marked with blue paint at the swivel) to the lower guy ring.

Note. The guys will be fastened to the stakes and tensioned after the mast is extended.

19. Connections (fig. 11)

If 24-volt direct-current (dc) power is to be used, one cable connection is required between the trailer and the battery of the towing vehicle for operating the mast and lights (*a* below). If 110-volt alternating current (ac) is to be used, check to see that the plug on the power unit cable is securely fastened in the twist-lock receptacle on the power unit. This plug is removed only when the power unit cover is used for waterfording.

a. Trailer to Towing Vehicle.

(1) When 24-volt dc power is used, uncoil the free end of the dc power cable (22 feet) from the storage reel on top of the motor and pump box.

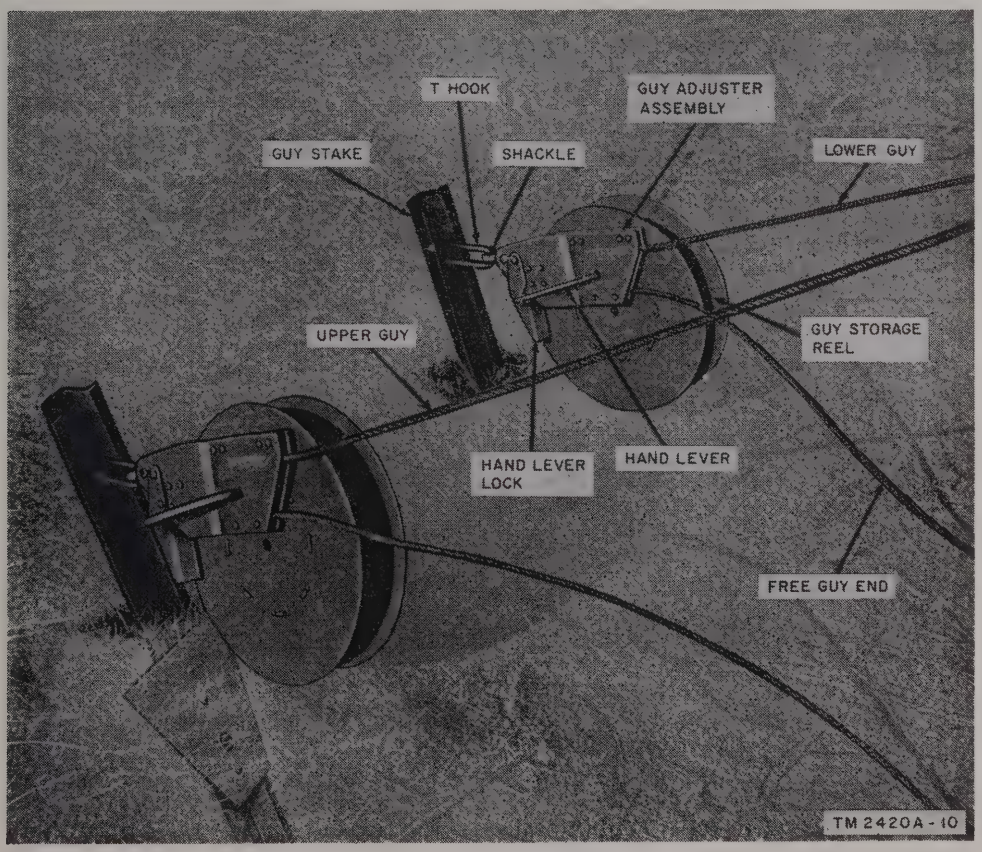


Figure 9. Guy adjuster assemblies on stakes.

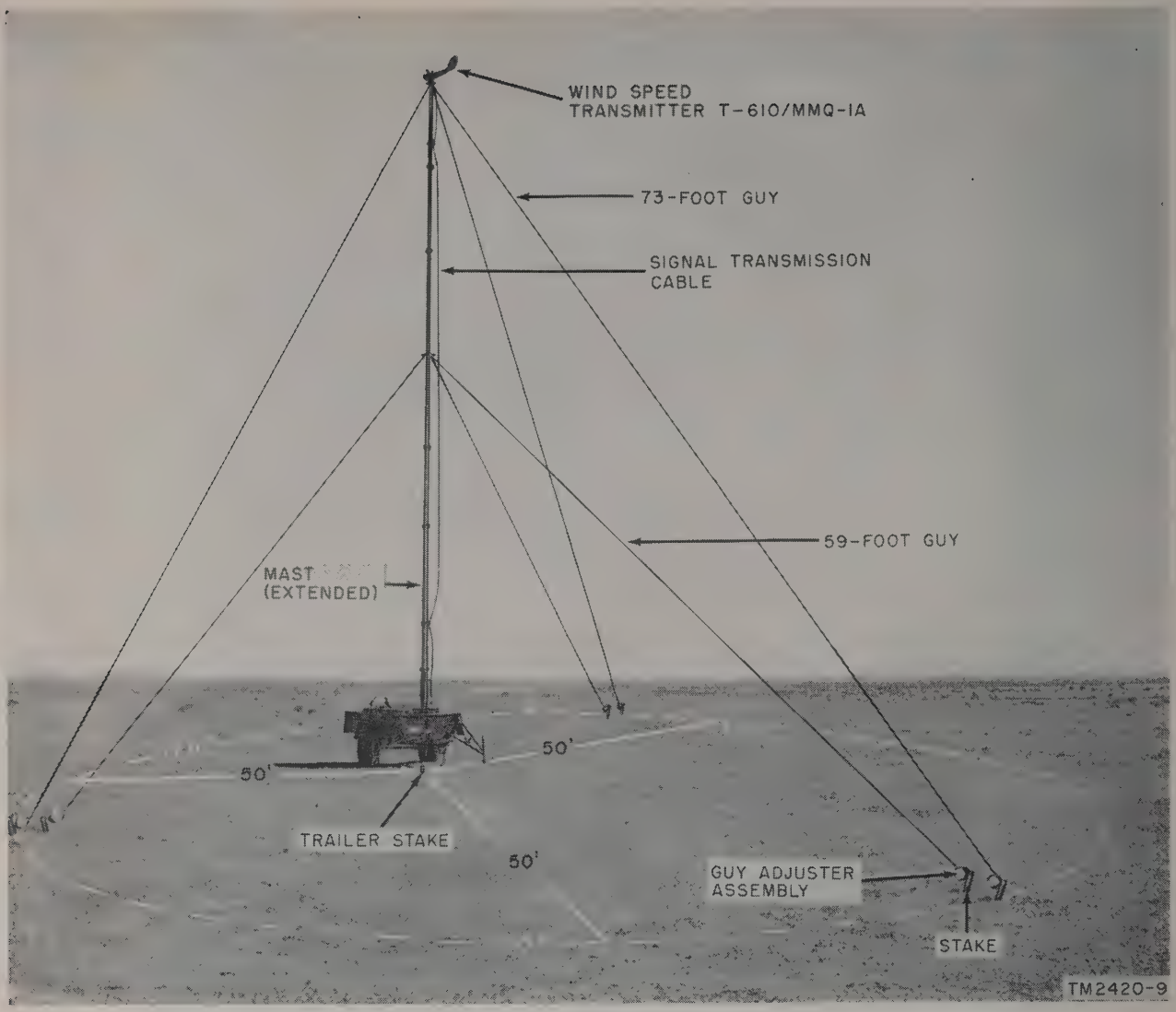


Figure 10. Wind Measuring Set AN/MMQ–1A, mast extended and guyed.

(2) Connect the two spring-loaded clips on the end of the cable to the terminals of the battery in the towing vehicle. (Polarity of this connection is not important.)

b. Trailer to Indicator Location. Three pairs of Wire WD–1/TT (maximum length 1-mile each) are required between the trailer and the indicator location: two pairs for the signal transmission and one pair for a talking circuit. A signal transmission cable is required between the wind transmitter and the junction box. One end of the signal transmission cable is connected when installing the wind speed transmitter on the mast (par. 14*c*) ; the other end is connected after the mast is extended (par. 30*c*).

(1) Obtain three pairs of Wire WD–1/TT, long enough to reach the indicator location.

(2) Remove 1 inch of insulation from the ends of the first pair and twist the ends together to form a single conductor. Connect it to binding post 2 on the terminal board on the outside wall of the trailer. Mark the wire dispenser *pair 1*.

(3) Remove 1 inch of insulation from the ends of the second pair and connect the ends to binding posts 1 and 3, respectively. Mark the wire dispenser *pair 2*.

(4) Remove 1 inch of insulation from the

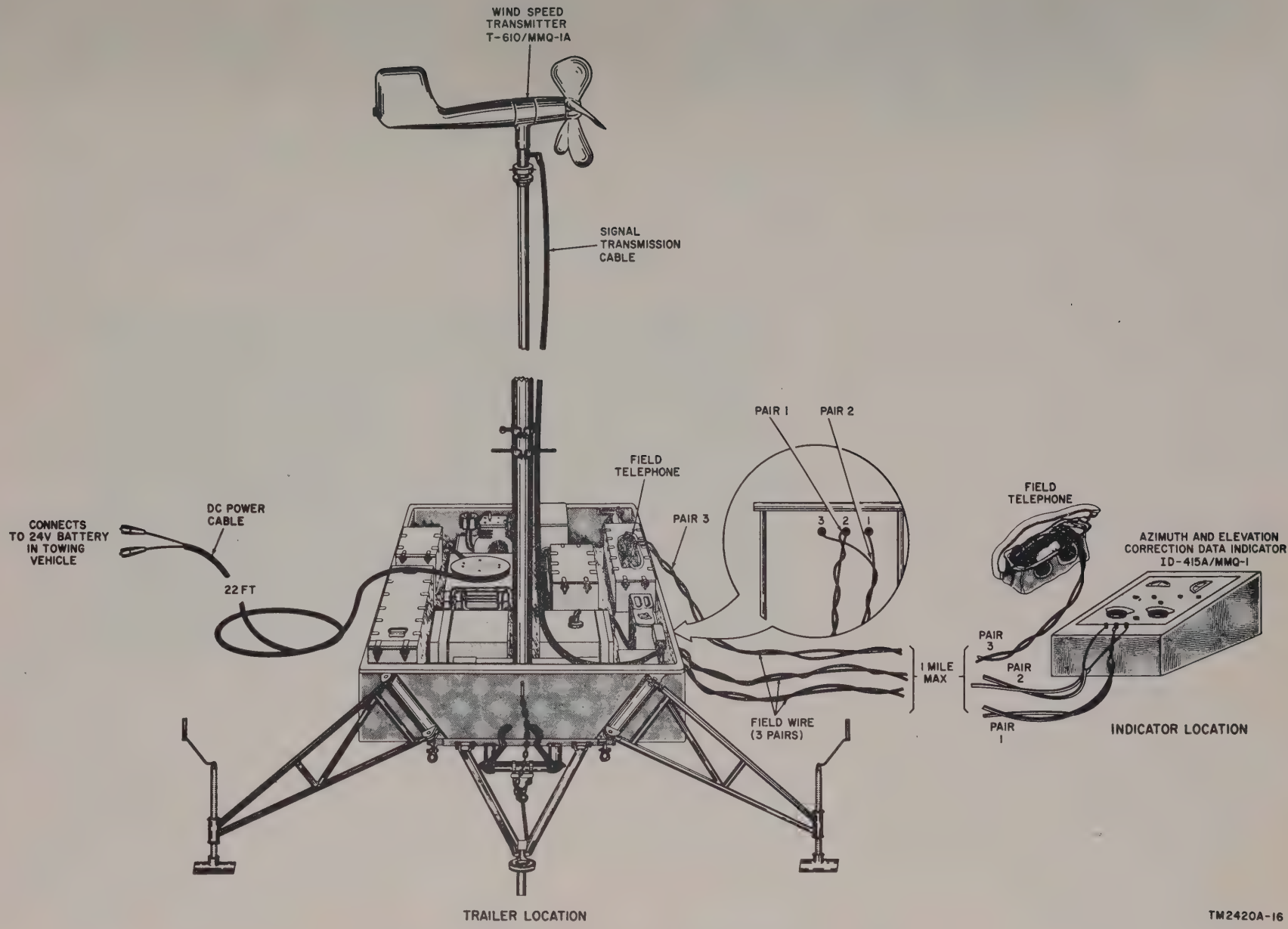


Figure 11. Wind Measuring Set AN/MMQ–1A, connection diagram.

ends of the third pair and connect the ends to the line terminals of a field telephone. Mark the wire dispenser *pair 3*.

(5) Run the three field wire pairs to the indicator location.

Note. If the indicator is more than ½ mile from the trailer, splice the wire to additional ½-mile lengths. Refer to TM 11–2240, for splicing instructions.

(6) Connect pair 3 to the line terminals of a field telephone at the indicator location to establish a talking circuit.

(7) Form a single conductor of pair 1 ((2) above) and connect it to binding post 2 on the indicator.

(8) Give the following instructions over the talking circuit to personnel at the trailer site:

(*a*) Disconnect the wire from the L1 terminal of the field telephone.

(*b*) Connect the L1 terminal to binding post 3 on the trailer.

(*c*) Monitor the line until the talking circuit is reestablished.

(9) Connect one of the conductors of pair 2 to the L1 or L2 terminal of the field telephone. If the talking circuit is not reestablished, try the other conductor of pair 2. (Either connection may complete the talking circuit.)

(10) Instruct the personnel at the trailer location to remove the connection be-

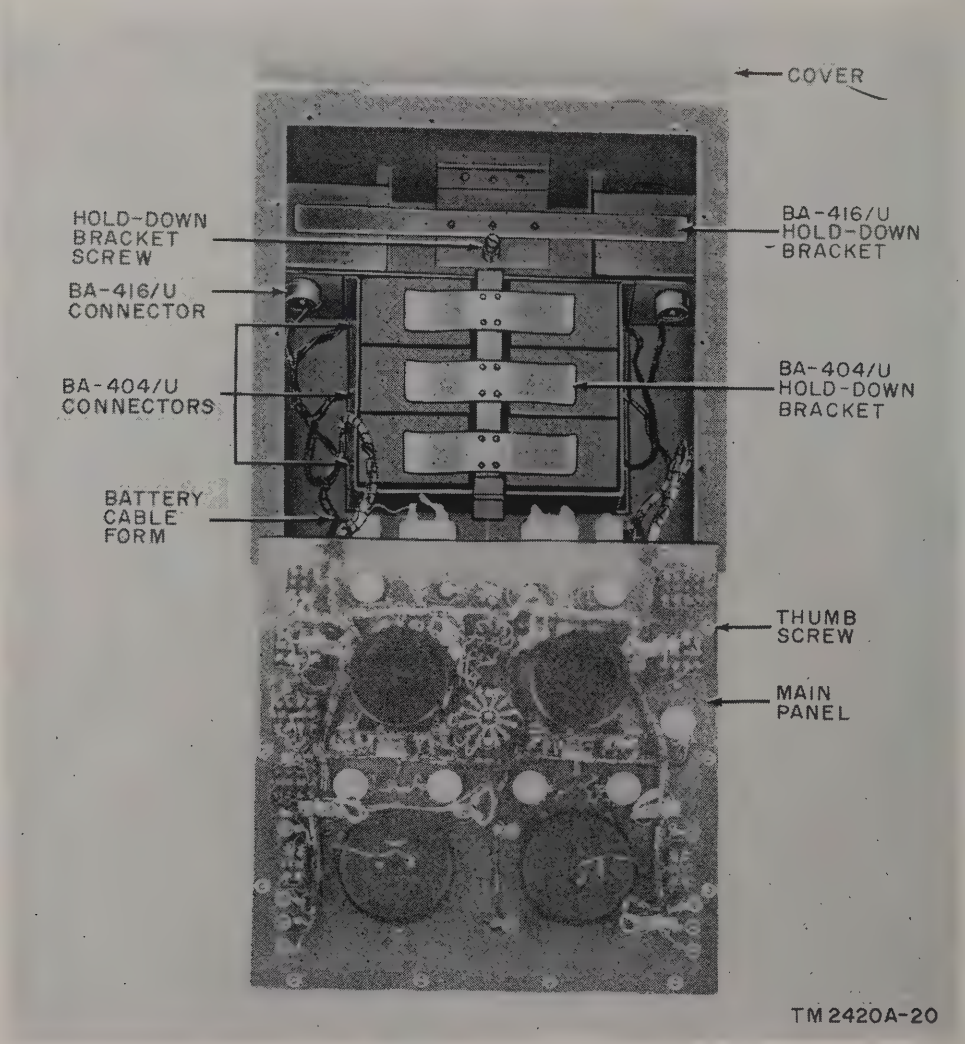


Figure 12. Installation of batteries in indicator.

tween L1 terminal and binding post 3 and reestablish the talking circuit over pair 3.

(11) Connect the conductor of pair 2 that completes the talking circuit to binding post 3 on the indicator.

(12) Connect the remaining conductor of pair 2 to binding post 1 on the indicator.

20. Installation of Indicator Batteries (fig. 12)

a. Open the hinged cover of the case.

b. Loosen the 10 thumb screws on three sides of the main panel.

c. Swing the hinged main panel forward and carefully place it in front of the case.

Caution: The battery cable form is attached to the main panel. Position the main panel so that there is no drag on the battery cable form.

d. Loosen the holddown bracket screw and swing the hinged battery holddown brackets up from the case.

e. Insert two Batteries BA–416/U and six Batteries BA–404/U in their respective locations. Position the batteries so that the receptacles can be reached through the cutouts.

f. Insert the BA–416/U and the BA–404/U connectors into the receptacles (part of battery).

g. Swing the battery holddown brackets over the batteries and tighten the battery holddown bracket screw.

h. Swing the main panel back into place and tighten the 10 thumbscrews.

21. Preparing Power Unit PE–75–AF for Operation (fig. 13)

The power unit as installed in the trailer is connected and ready for use. Refer to TM 11–900A, for detailed information on the power unit.

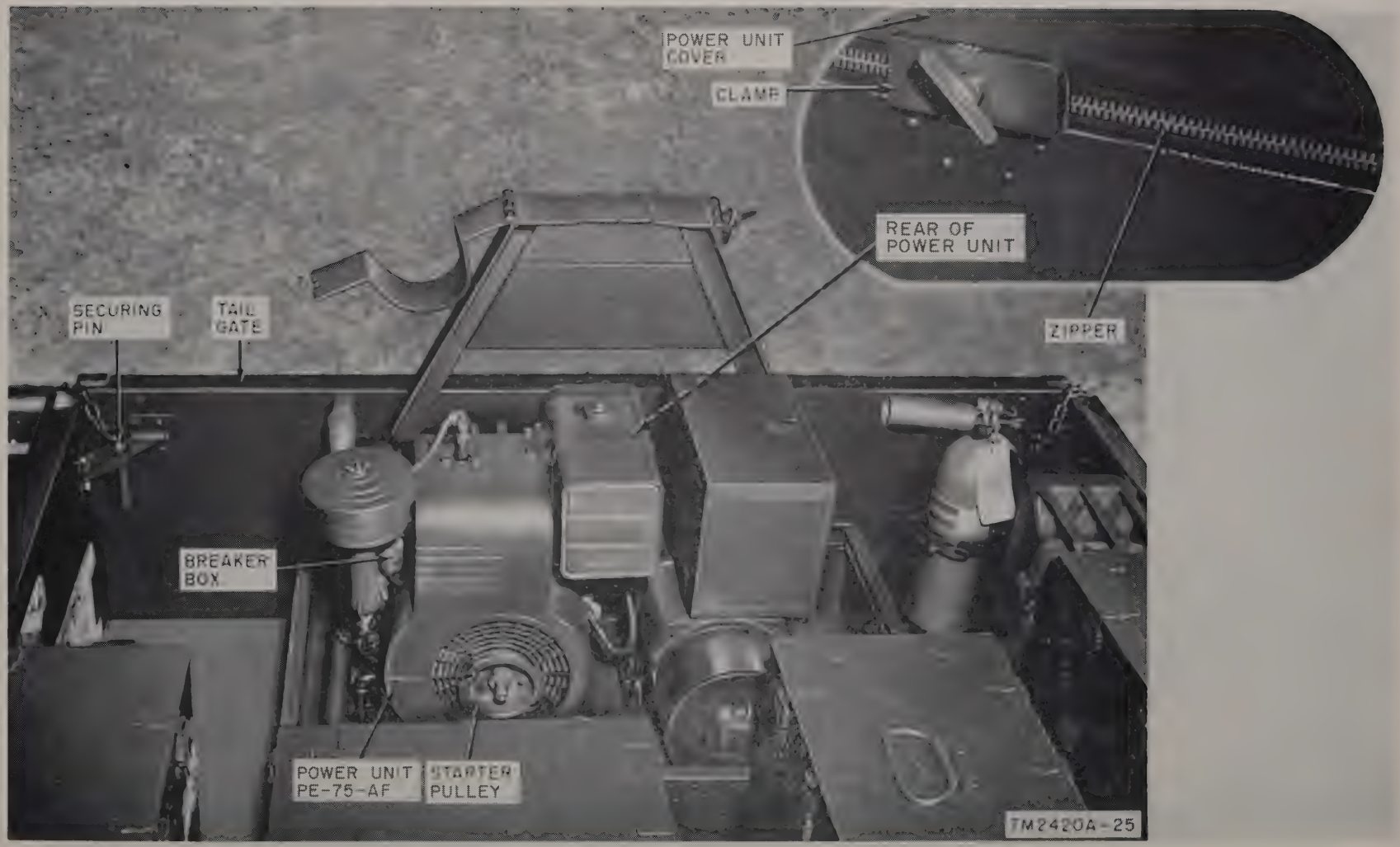


Figure 13. Power Unit PE–75–AF, mounted in trailer.

CHAPTER 3
OPERATION

Section I. CONTROLS AND INSTRUMENTS

Note. Paragraphs 22 through 26 locate, illustrate, and describes the uses of the various controls and instruments.

22. Mast AB—329A/G, Controls and Instruments

Control or instrument	Figure No.	Description and function
Mil scale	7	A circular scale calibrated in mils. Used in orienting the mast.
Oil shutoff valve	7	A blue handled oil gate valve at the base of the mast. Controls the flow of oil into and out of the mast.
Levels	7	Two small levels with protective caps at the base of the mast. Used when leveling the trailer.
Mast pressure relief valve	7	A safety valve bridged around the oil shutoff valve. Provides an escape path for the oil if the oil pressure in the extended mast is increased beyond 60 pounds per square inch by solar heat.
Pressure relief valve	4, item 3	A safety valve. Provides an oil return path to the tank when oil pressure reaches 60 pounds per square inch.
Oil control valve (red)	4, item 1	A red handled oil gate valve. Controls the flow of oil into and out of the 110-volt ac pump.
Oil control valve (yellow)	4, item 2	A yellow handled oil gate valve. Controls the flow of oil into and out of the 24-volt dc pump.
Oil tank vent valve (green)	4, item 16	A green handled oil gate valve. Acts as an oil tank vent during normal operation. Acts as an oil tank seal when fording.
Rotating handle	8	A handle mounted on the stationary mast section. Used for turning the mast when orienting.
Peep sight	8	A tube with a vertical hair line at one end and a small peep hole at the other end mounted on the stationary mast section. Used in orienting the mast.

23. Control Box, Controls (fig. 14)

Controls	Description and function
110V A.C. circuit breaker	A 2-position, single-pole circuit breaker. *Position* — *Function* ON — Connects ac power for ac pump and ac light circuits. OFF — Disconnects ac power from ac pump and ac light circuits.
PUMP 110V A.C.	A 3-position, 4-pole switch. *Position* — *Function* UP — Supplies power to ac motor for extending the mast. OFF — Disconnects power from ac motor. DOWN — Supplies power to ac motor for retracting the mast.
PUMP 24V D.C.	A 3-position, 4-pole switch. *Position* — *Function* UP — Supplies power to dc motor for extending the mast. OFF — Disconnects power from dc motor. DOWN — Supplies power to dc motor for retracting the mast.

Controls	Description and function
LIGHTS switch	A 3-position, 4-pole switch. *Position* — *Function* ON 110V A.C. — Connects ac power to ac lamps for lighting base of mast. OFF — Disconnects power from ac and dc lamps. ON 24V D.C. — Connects dc power to dc lamps for lighting base of mast.

24. Wind Speed Transmitter T–610/MMQ–1A, Controls and Instruments
(fig. 2)

Control or instrument	Description and function
Impeller	A 6-bladed impeller. Drives generator proportional to wind speed.
Tail vane	Detects wind direction and keeps impeller positioned into wind.
Generator	A 2-pole, dc generator. Develops the potential applied to the sine-cosine potentiometer.
Sine-cosine potentiometer	A 2-ganged potentiometer phased for sine and cosine outputs. Provides separate outputs for azimuth and elevation corrections.

25. Azimuth and Elevation Correction Data Indicator ID–415A/MMQ–1, Controls and Instruments
(fig. 15)

Two sets of controls with the same panel marking appear on the main panel: there are two METER SCALE switches, two BIAS CHECK switches, two BIAS ADJUST controls, two ZERO ADJUST controls, and two FULL SCALE ADJUST controls. The set of controls on the left side of the main panel is for the azimuth circuit; the set of controls on the right side is for the elevation circuit. The description and function of each set are identical; only one set of controls is described in chart below.

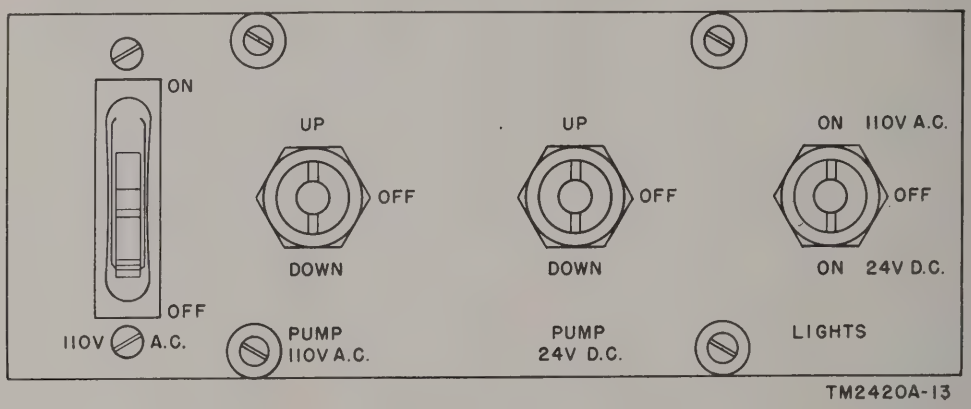


Figure 14. Control box, controls.

Control or instrument	Description and function
METER SCALE switch	A 2-position, double-pole switch. *Position* — *Function* OUTER — Connects signal to circuit for indication on outer scale of meter. INNER — Connects signal to circuit for indication on inner scale of meter.
BIAS CHECK switch	A spring-loaded, 2-position, 4-pole switch. *Position* — *Function* UP — Connects meter to circuit for normal operation. DOWN — Connects bias circuit to meter for bias voltage indication.
BIAS ADJUST control	A screwdriver-controlled potentiometer in the bias circuit of the amplifier. Clockwise rotation of the control increases the bias of the amplifier. Counterclockwise rotation of the control decreases the bias of the amplifier.

Control or instrument	Description and function
FULL SCALE ADJUST-ZERO ADJUST-OPERATE switch	A 3-position, four-pole switch. *Position* — *Function* FULL SCALE ADJUST — Allows both meters to be arranged for full scale indication by using the test voltage. ZERO ADJUST — Disconnects input signal so that both meters can be electrically zeroed. OPERATE — Completes circuit to binding posts 1, 2, and 3 for normal operation.
SIG VOLTAGE CHECK switch	A spring-loaded, 2-position, 4-pole switch. *Position* — *Function* UP — Connects azimuth and elevation circuits for normal operation. Down — Connects meters to test voltage circuit.
SIG VOLTAGE ADJUST control	A screwdriver-controlled potentiometer in the test voltage circuit. Provides adjustment for test voltage to 1.5 volts.
LIGHT switch	A 2-position, double-pole switch. *Position* — *Function* ON — Connects dc power to panel lights. OFF — Disconnects dc power from panel lights.
POWER switch	A 2-position, double-pole switch. *Position* — *Function* ON — Connects dc filament and plate voltage to amplifiers. OFF — Disconnects dc filament and plate voltage from amplifiers.
Binding posts 1, 2, and 3	Three binding posts used to connect field wire from the trailer to the indicator.
AZIMUTH CORRECTION (MILS) meter	A microammeter calibrated in mils to indicate azimuth correction data.
ELEVATION CORRECTION (MILS) meter	A microammeter calibrated in mils to indicate elevation correction in data.
ZERO ADJUST control	A knob-controlled potentiometer in the plate circuit of the amplifier. Provides adjustment for proper plate voltage.
FULL SCALE ADJUST control	A knob-controlled potentiometer in the plate circuit of the amplifier. Provides adjustment for full-scale meter indication by using test voltage.
AZIMUTH (MILS) control	A knob-controlled dual potentiometer. Controls voltage to AZIMUTH CORRECTION (MILS) meter.
ELEVATION (MILS) control	A knob-controlled dual potentiometer. Controls voltage to ELEVATION CORRECTION (MILS) meter.
AVERAGE READING-DIRECT READING control	A 2-position, 3-section switch. *Position* — *Function* AVERAGE READING — Connects the input signal to the meter through the vacuum-tube circuit to provide average wind values. DIRECT READING — Connects the input signal around the vacuum-tube circuit for emergency operation.
MINUTES switch	A 6-position, knob-controlled switch. Applies proper time constant to amplifier circuit.

26. Power Unit PE–75–AF, Controls

The stop button is located on the breaker box.

Control	Description and function
Starter pulley (fig. 13)	A notched reel upon which starting rope is wound. When rope is pulled, starter pulley rotates to start power unit.
Stop button	A spring-loaded, push-button switch. Stops power unit.

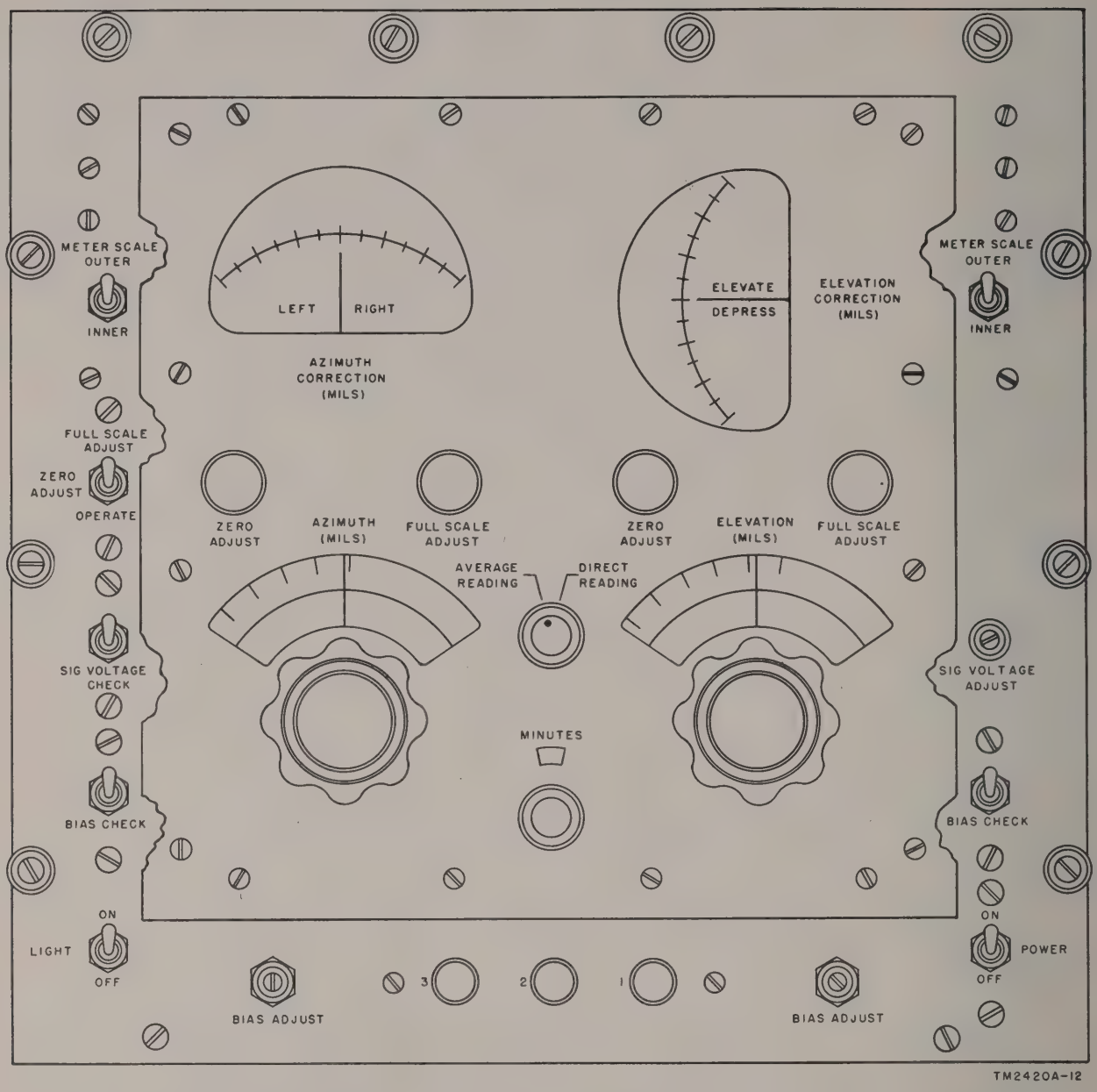


Figure 15. Azimuth and Elevation Correction Data Indicator ID–415/MMQ–1, controls and instruments.

Section II. OPERATION UNDER USUAL CONDITIONS

27. Preoperational Checks and Procedures

a. Power.

(1) Check to see that the fuel supply is adequate for alternating-current (ac) operation.

(2) Make sure that the dc power cable has been connected (par. 19*a*) to the battery of the towing vehicle for dc operation.

b. Trailer.

(1) Check the leveling jacks. See that they are firmly seated (par. 13*b* and *c*) in the jack pads.

(2) Check to see that the trailer is level (par. 16*d*).

(3) Check to see that the locking rings (par. 16*e*) are tight on the leveling jacks.

c. Oil Tank (fig. 4).

(1) Remove the filler cap and oil tank vent valve (16). Make sure that the valve is not clogged.

(2) Check the oil level with the measuring stick located in the tool case. The minimum level for safe operation is 24 gallons. This is equal to the REFILL mark on the measuring stick. Add oil if necessary.

(3) Replace the filler cap and oil tank vent valve.

d. Signal Transmission Cable.

(1) Check to see that the plug of the cable is securely fastened to the receptacle on the wind speed transmitter (par. 14*c*).

(2) Prepare the cable so that it will move freely through the spiral cable guides on the mast.

e. Control Box (fig. 14).

(1) Unlatch the cover. Let it hang from the two captive latches.

(2) Make sure that the four switches are in the off position.

f. Oil Control Valves (fig. 4). See that the following valves are fully closed (clockwise).

(1) Oil tank vent valve (green) on oil tank.

(2) Oil control valve (red) in front of motor and pump box.

(3) Oil control valve (yellow) in front of the motor and pump box.

(4) Oil shutoff valve (blue) at base of mast.

g. Guys.

(1) Check to see that the correct guys are securely hooked to the guy rings (par. 18*b*).

(2) Arrange the guys so that they will move freely when the mast is extended.

28. Operation Using Dc Power

(figs. 4 and 14)

a. Extending Mast.

(1) Operate the LIGHTS switch to the ON 24V D.C. position if light is required at the base of the mast.

(2) Turn the handle of the oil tank vent valve (green) to the fully open (counterclockwise) position.

(3) Turn the handle of the oil control valve (yellow) to the fully open (counterclockwise) position.

(4) Turn the handle of the oil shutoff valve (blue) to the fully open (counterclockwise) position.

(5) Operate the PUMP 24V D.C. switch to the UP position to raise the mast.

(6) Turn the handle of the oil shutoff valve (blue) to the fully closed (clockwise) position when the mast is fully extended.

(7) Operate the PUMP 24V D.C. switch to the OFF position.

Caution: When the PUMP 24V D.C. switch is in the UP or DOWN position and the operator wants to reverse the movement of the mast, the switch must first be operated to the OFF position and left in that position until the motor stops turning. The switch then can be operated to the desired position. If the switch is operated from one position (UP or DOWN) to the opposite position without waiting for the motor to stop, the motor may become damaged.

b. Retracting Mast.

(1) Turn the handle of the oil shutoff valve (blue) to the fully open (counterclockwise) position.

(2) Operate the PUMP 24V D.C. switch to the DOWN position.

(3) Turn the handle of the oil shutoff valve (blue) to the fully closed (clockwise) position after the mast is retracted.

(4) Turn the handle of the oil control valve (yellow) to the fully closed (clockwise) position.

(5) Turn the handle of the oil tank vent valve (green) to the fully closed (clockwise) position.

(6) Operate the LIGHTS switch to the OFF position.

(7) Operate the PUMP 24V D.C. switch to the OFF position.

29. Operation Using Ac Power
(figs. 4 and 14)

a. Starting Power Unit.

(1) Remove the starting rope from the power unit tool box and wind it on the starting pulley.

(2) Pull the rope to start the power unit.

Note. Refer to TM 11–900A, for detailed operational procedure on the power unit.

b. Extending Mast.

(1) Operate the 110V A.C. circuit breaker to the ON position.

(2) Opereate the LIGHTS switch to the ON 110V A.C. position if light is required at the base of the mast.

(3) Turn the handle of the oil tank vent valve (green) to the fully open (counterclockwise) position.

(4) Turn the handle of the oil control valve (red) to the fully open (counterclockwise) position.

(5) Turn the handle of the oil shutoff valve (blue) to the fully open (counterclockwise) position.

(6) Operate the PUMP 110V A.C. switch to the UP position to raise the mast.

(7) Turn the handle of the oil shutoff valve (blue) to the fully closed (clockwise) position when the mast is fully extended.

(8) Operate the PUMP 110V A.C. switch to the OFF position.

(9) When the mast is to be kept extended for a considerable period, press the stop button to stop the power unit.

Note. When the PUMP 110V A.C. switch is in the UP or DOWN position and the operator wants to reverse the movement of the mast, the switch must first be operated to the OFF position and left in that position until the motor stops turning. The switch then can be operated to the desired position. If the switch is operated from one position (UP or DOWN) to the opposite position without waiting for the motor to stop, the motor will continue to run in the same direction.

c. Retracting Mast.

(1) Start the power unit (*a* above) if it is not running.

(2) Turn the handle of the oil shutoff valve (blue) to the fully open (counterclockwise) position.

(3) Operate the PUMP 110V A.C. switch to the DOWN position.

(4) Turn the handle of the oil shutoff valve (blue) to the fully closed (clockwise) position after the mast is retracted.

(5) Operate the PUMP 110V A.C. switch to the OFF position.

(6) Operate the 110V A.C. circuit breaker to the OFF position.

(7) Turn the handle of the oil control valve (red) to the fully closed (clockwise) position.

(8) Turn the handle of the oil tank vent valve (green) to the fully closed (clockwise) position.

(9) Operate the LIGHTS switch to the OFF position.

30. Attaching Guys to Stakes, Adjusting Guys, and Connecting Signal Transmission Cable

After the mast has been fully extended attach the guys to the stakes (*a* below), adjust the guys (*b* below) until the mast remains in the vertical position, and connect the loose end of the signal transmission cable (*c* below).

a. To attach the guys to the stakes (fig. 9), proceed as follows:

(1) Carry one 59-foot and one 73-foot guy to each of the three stake locations. Unreel the guys from the guy storage reels while carrying them to the stake locations.

(2) Insert a T-hook through the hole in each stake from the side away from the trailer.

(3) Attach the shackle of the guy adjuster assembly to the T-hook.

b. To tension a guy, proceed as follows:

(1) Push and hold the hand lever lock toward the guy stake; turn the hand lever counterclockwise until the guy moves freely through the guy adjuster.

(2) Pull the free guy end from the adjuster while pulling on the fixed end

from the mast until the slack is removed from the guy.

Caution: Do not overtension the guys. Apply only the minimum amount of tension required to keep the mast from swaying. Always tension the three guys from each ring at the same time to avoid bending the mast.

(3) Turn the hand lever clockwise until it is locked in position by the hand lever lock.

c. Connect the loose end of the signal transmission cable (fig. 11) to the terminal box on the inside wall of the trailer. This connection completes the cable connections (par. 19).

31. Azimuth and Elevation Correction Data Indicator ID–415A/MMQ–1 (fig. 15)

Note. Whenever a meter is to be read, tap the face of the meter gently with the finger tips to insure proper indication. Tapping the meter face will prevent false indications due to friction of the indicator movement.

a. Preparation.

(1) Operate the LIGHT switch to the ON position.

(2) Operate the AVERAGE READING-DIRECT READING switch to the AVERAGE READING position.

(3) Rotate the MINUTES switch to the extreme clockwise position.

(4) Operate both METER SCALE switches to the INNER position.

(5) Rotate the AZIMUTH (MILS) and ELEVATION (MILS) controls to the extreme counterclockwise positions.

Caution: Do not force the controls beyond the mechanical stops.

(6) Operate the POWER switch to the ON position. Allow the indicator to warm up for 3 minutes.

(7) Operate the FULL SCALE ADJUST-ZERO ADJUST-OPERATE switch to the ZERO ADJUST position.

(8) Adjust the azimuth ZERO-ADJUST control (left side of main panel) until the AZIMUTH-CORRECTION (MILS) meter indicates 0.

(9) Adjust the elevation ZERO-ADJUST control (right side of main panel) until the ELEVATION-CORRECTION (MILS) meter indicates 0.

(10) Operate and hold the azimuth BIAS-CHECK switch (left side of main panel) to the down position. The AZIMUTH-CORRECTION (MILS) meter should indicate on the red line. The tolerance for this indication is ½ of a small scale division from the red line. If necessary, adjust the azimuth BIAS ADJUST control (left side of main panel) until the AZIMUTH-CORRECTION (MILS) meter indicates on the red line. Release the BIAS CHECK switch.

(11) Operate and hold the elevation BIAS-CHECK switch (right side of main panel) to the down position. The ELEVATION-CORRECTION (MILS) meter should indicate 150 mils. The tolerance for this indication is ½ of a small scale division from the 150 mils line. If necessary, adjust the elevation BIAS-ADJUST control (right side of main panel) until the ELEVATION CORRECTION (MILS) meter indicates 150 mils. Release the BIAS CHECK switch.

Note. If it is necessary to adjust the BIAS-ADJUST controls in (10) or (11) above, repeat (7) through (11) above until the required results are obtained.

(12) Operate the FULL-SCALE-ADJUST-ZERO-ADJUST-OPERATE switch to the FULL-SCALE-ADJUST position.

(13) Operate and hold the SIG VOLTAGE-CHECK switch to the down position. Both meters should indicate full-scale deflection; AZIMUTH-CORRECTION (MILS) meter deflects to RIGHT and ELEVATION-CORRECTION (MILS) meter deflects to ELEVATE. If necessary, adjust the SIG VOLTAGE-ADJUST control until both meters indicate full-scale deflection. Release the SIG VOLTAGE-CHECK switch.

(14) Adjust the FULL-SCALE-ADJUST control until both meters indicate full-

scale deflection; AZIMUTH-CORRECTION (MILS) meter deflects to LEFT and ELEVATION-CORRECTION (MILS) meter deflects to DEPRESS.

(15) Repeat (7) through (9) and (12) through (14) above until the required results are obtained.

(16) Operate the LIGHT switch to the OFF position.

Note. To preserve the batteries, use the lights only when calibrating the indicator and actually taking meter readings.

b. Operation. Each time the indicator is used, perform all procedures in *a* above; then proceed as follows:

(1) Operate the FULL-SCALE-ADJUST-ZERO ADJUST-OPERATE switch to the OPERATE position.

(2) Set the AZIMUTH (MILS) control, ELEVATION (MILS) control, and MINUTES switch to the positions specified in the data supplied.

(3) Operate the METER-SCALE switches to the position (OUTER or INNER) which will provide the greatest meter deflection.

Note. The METER-SCALE switches may be operated to opposite positions without interaction between the azimuth and elevation circuits.

32. Disassembly for Removal

a. Removing Guying Equipment. As soon as the mast starts down (retracting), remove and store the guying equipment as follows:

(1) Disengage the shackles of the guy adjuster assemblies from the T-hooks (fig. 9).

(2) Remove the T-hooks from the stakes.

(3) Loosen the stakes by hitting the sides with the sledge hammer. Remove each stake by exerting a steady upward pull.

(4) Wind each guy on its guy storage reel while moving toward the trailer.

(5) Unhook the guys from the guy rings on the mast (fig. 8).

(6) Store the guy stakes, guy adjuster assemblies, T-hooks, driving caps, and sledge hammer in the guying equipment case (15, fig. 4).

b. Disconnecting Cables (fig. 11).

(1) Disconnect the dc power cable from the battery of the towing vehicle. Wind the dc cable on the storage reel on top of the pump and motor box.

(2) Disconnect the signal transmission cable from the wind speed transmitter and the terminal box. Remove the cable from the cable guides on the mast. Coil the cable and store it in case CY–1805/MMQ–1.

(3) Disconnect the three pairs of field wire; one pair from the field telephone, two pairs from the terminal board on the outside wall of the trailer.

c. Securing Mast and Wind Speed Transmitter for Transportation. Two men are required to lower the mast to the transporting position. When lowering the mast, use the mast rotating handle (fig. 8) and grasp the body of the mast. *Do not use the peep sight as a handle.*

(1) See that the four wing bolts inside the mil scale on the base of the mast (fig. 7) are tight.

(2) Loosen the two wingnuts that secure the mast base plate in the upright position. Lay the wingnuts flat.

(3) Slowly lower the mast until it is firmly seated in the A-frame (fig. 1). Secure it to the A-frame with the mast clamp.

(4) Support the wind speed transmitter and turn the locking collar counterclockwise until it is free from the mast adapter.

(5) Disassemble and store the wind speed transmitter in case CY–1805/MMQ–1.

(6) Replace the protective cap on the mast.

d. Securing Leveling Jacks.

(1) Loosen the locking rings on the front leveling jacks and turn the jack handles counterclockwise until the jacks are free from the jack pads (fig. 8). Retighten the locking rings.

(2) Remove the jack handles and store them in the guying equipment case.

(3) Remove the locking pins, raise the jacks to the transporting position, and replace the locking pins. Fasten the

jacks in place with the front leveling jacks securing chain.

(4) Loosen the locking ring on the rear leveling jack and turn the jack handle counterclockwise until the jack is free from the jack pad (fig. 5). Retighten the locking ring.

(5) Remove the locking pin, raise the jack to the transporting position, and replace the locking pin.

(6) Store the three jack pads in the brackets on the inner wall of the trailer.

e. Securing Trailer for Transportation.

(1) Connect the lunette (fig. 8) of the drawbar to the pintle hook of the towing vehicle.

(2) Connect the safety chains of the trailer to the towing vehicle.

(3) Connect the trailer lighting cable (fig. 1) to the towing vehicle.

(4) Unlock the front support leg (fig. 8) and raise and lock it in the transporting position.

(5) Release the trailer wheel brakes.

(6) Check to see that all equipment and tools are stored in the proper cases (par. 11).

(7) Replace the canvas cover support (fig. 1).

(8) Replace all watertight box and case covers.

(9) Replace the canvas cover.

Section III. OPERATION UNDER UNUSUAL CONDITIONS

33. Operation in Arctic Climate

Climatic conditions associated with subzero temperatures affect the normal operation of the equipment. Snow, ice crystals, or frost may become attached to the impeller blades, hub, or tail vane of the wind speed transmitter, affecting the sensitivity of the equipment. Handle the equipment carefully and follow the procedures below:

a. Clean and dry the components before putting them in operation.

b. Wash all lubricant from the threads and housing on the leveling jacks. Operate them dry.

c. Thin the oil in the hydraulic system as follows:

(1) Turn the oil tank vent valve (green) fully counterclockwise (fig. 4).

(2) Turn the oil control valve (red or yellow depending on which motor and pump are used (par. 22)) fully counterclockwise.

(3) Turn the oil shutoff valve (blue) fully clockwise.

(4) Remove the hose connection from the base of the mast. Loosen the nut at the mast end of the hose with the 10-inch adjustable wrench.

(5) Place the end of the hose over the side of the trailer into a container.

(6) Operate the proper pump switch (fig. 14) to the up position and pump enough oil from the tank to permit adding the necessary amount of kerosene for the required temperature (*d* below).

(7) Operate the pump switch to the OFF position and reconnect the hose to the base of the mast.

(8) Remove the filler cap and add the required amount of kerosene to the tank (*d* below). Replace the filler cap.

(9) Operate the pump switch to the up position. Allow the pump to circulate the oil for 5 minutes.

(10) Turn the oil shutoff valve (blue) fully counterclockwise and allow the mast to fully extend.

(11) Operate the pump switch to the OFF position; wait for the motor to stop and then operate the pump switch to the DOWN position to retract the mast.

Note. This procedure will insure the thorough mixing of the oil and kerosene and will provide correct lubrication for the mast.

(12) Tag the oil tank filler cap. Indicate the temperature for which the oil has been diluted and the per cent of kerosene that has been added on the tag.

d. The chart below shows the correct mixture of kerosene and oil for efficient operation of the hydraulic system at low temperatures.

Temperature ° F.	Percent of kerosene	Amount of kerosene (gal)	Amount of oil (SAE 10) (gal)
+20	0	0	27.5
+10	10	2.75	24.75
0	20	5.5	22.0
—10	30	8.25	19.25
—20	40	11.0	16.5
—30	50	13.75	13.75
—40	60	16.5	11.0

34. Operation in Desert Climate

The most serious problem in desert areas is sand, dust, and dirt which enters the moving parts of the equipment. Make frequent preventive maintenance checks (par. 39) and follow the procedures in *a* through *d* below.

a. Remove any dust and grit on the mast with a clean, dry cloth. If the felt wipers and seals are damaged, replace them immediately (par. 49).

b. If the mast has been extended for a long period of time, the dust and grit may make retraction difficult. Clean the mast as it is being retracted. Use the mast turning handle as a step as the mast comes down and clean each section.

c. Apply a thin coating of Dow Corning Compound No. 4 to the sealing surfaces of all containers and to the zipper and clamp of the power unit cover to prevent them from sticking when they are opened.

d. Wash all lubricant from the threads and housing on the leveling jacks. Operate them dry.

35. Preparation for Fording

The wind measuring set is designed for waterfording to a depth of 54 inches. To prepare the equipment for fording, proceed as follows:

a. Check to see that all oil control valves are closed (par. 27*f*).

b. Apply a thin coating of Dow Corning Compound No. 4, to the watertight seals of all containers; close the containers and fasten the covers with the spring loaded latches.

c. Remove the securing pins and lower the tail gate.

d. Swing down the hinged zipper protectors on three sides of the power unit (fig. 13).

e. Remove the power unit cover and zipper clamp from the power unit cover storage case.

f. Place the power unit cover over the power unit and secure it with the zipper.

g. Secure the zipper with the clamp (fig. 13). Turn the wing screw clockwise to tighten.

h. Raise the tail gate and replace the securing pins.

i. Install the canvas cover support rod and the canvas cover.

j. Check to see that the power unit oil drain closure underneath the trailer is securely tightened.

36. Azimuth and Elevation Correction Data Indicator ID—415A/MMQ—1, Emergency Operation

The indicator may be converted to a direct reading type instrument by following the procedures in *a* through *e* below.

a. Operate the POWER switch to the OFF position.

b. Operate the AVERAGE READING-DIRECT READING switch to the DIRECT READING position.

c. Check to see that the FULL-SCALE ADJUST-ZERO ADJUST-OPERATE switch is operated to the OPERATE position.

d. Operate the AZIMUTH (MILS) and ELEVATION (MILS) controls to the positions specified in the data supplied.

e. Operate the METER switches to the positions (OUTER or INNER) that provide the greater meter deflection.

Note. If required, the LIGHT switch may be operated. All other controls and switches will be ineffective.

CHAPTER 4
ORGANIZATIONAL MAINTENANCE

Note. Organizational maintenance is the maintenance performed at first and second echelons. First echelon maintenance is the operator's maintenance; second echelon maintenance is the unit repairman's maintenance.

Section I. OPERATOR'S MAINTENANCE

37. Scope of Operator's Maintenance

Operator's maintenance for the wind measuring set consists of preventive maintenance, lubrication, and tests. Paragraphs 39 through 41 explain the procedures to be followed by the operator.

38. Operator's Materials and Test Items

a. Materials.

Grease, Aircraft and Instruments (GL)
Grease, Automotive and Artillery (GAA)
Oil, Special Preservation (PL Special)
Oil, Engine, Heavy Duty (OE–30)
Dow Corning Compound No. 4
Lint-free cloth
Cleaning compound (Federal stock No. 7930–395–9542)
Scotch tape

b. Test Items.

Weight (½-inch diameter)
Weight (1-inch diameter)

39. Operator's Preventive Maintenance

a. Daily Checks.

(1) Check the trailer (fig. 1) as explained in TM 9–874A.

(2) Check the terminal board on the left hand side of the trailer body for terminals that have been bent or broken.

(3) Check all equipment and tool cases (fig. 4) to be sure they are in good condition and are securely mounted in the trailer. Be sure that the cover is securely fastened on each case.

(4) Check the mast to be sure it is securely fastened in the A-frame.

(5) Be sure the protective cap (fig. 5) is installed on top of the mast.

(6) Check the cable guides on the side of the mast to be sure they are not bent or broken.

(7) Check the cable receptacle on the terminal box (fig. 4) on the inner wall of the trailer to be sure it is not damaged.

(8) Check the peep sight (fig. 8) to be sure it has not been damaged.

(9) Check the rotating handle to be sure that it has not been damaged.

(10) Check the two levels (fig. 7) at the bottom of the mast to be sure they have not been broken. Be sure the level protective caps cover the levels and can be moved easily.

(11) Check the mil scale, mil scale pointer, and mil scale locking screws to be sure they are clean and in good condition.

(12) Check the PE–75–AF (fig. 13) as explained in TM 11–900A.

b. Weekly Checks.

(1) Lower the front and rear leveling jacks (par. 13). Check to be sure that the jacks (figs. 5 and 8) swing freely on the hinges. Check the leveling screws to be sure they have not been damaged.

(2) Check the contents of each equipment (fig. 4) and tool case (par. 11) to be sure the components are in good condition and are stored in the proper case. Clean rust and corrosion from all tools and components.

(3) Check the sealing surface of each cover to be sure it is covered with a light coat of compound No. 4.

(4) Start the PE–75–AF (par. 29*a*) and allow it to operate for about 15 minutes.

Be sure the motor is thoroughly warmed before stopping the unit.

c. Monthly Checks. The monthly checks consist of an operational test of the equipment to be sure all components are functioning properly. Follow the procedure in (1) through (11) below to perform the monthly checks.

(1) Install the wind speed transmitter on the mast (par. 14*b*). Be sure the wind speed transmitter (fig. 6) fits on the mast adapter properly and the locking collar securely fastens the wind speed transmitter to the top of the mast.

(2) Before erecting the mast, check the signal transmission circuits of the AN/MMQ–1A as follows:

(*a*) Connect the signal transmission cable between the cable receptacle on the wind speed transmitter (par. 14*c*) and the terminal box (par. 30*c*).

(*b*) Connect three short pieces of field wire between terminals 1, 2, and 3 of the terminal board and the indicator respectively. Figure 11 illustrates the terminals at which the connections are made.

(*c*) Manually rotate the wind vane on the mast, then, rapidly rotate the impeller. Both meters on the indicator should indicate.

(3) Disconnect the signal transmission cable and the field wire. Do not remove the wind speed transmitter from the mast.

(4) Raise the mast to the upright position (par. 15).

(5) Connect the dc power cable to a 24-volt dc source (par. 19*a*).

(6) Extend the mast to its maximum height by using dc power (par. 28*a*). Operate the motor about 1 minute after the mast is in the extend position to be sure that there are no oil leaks and that the pressure relief valve is operating properly.

(7) Retract the mast by using dc power (par. 28*b*).

(8) Extend the mast by using ac power (par. 29*b*). Operate the motor about 1 minute after the mast is in the extended position to be sure there are no oil leaks and that the pressure relief valve is operating properly.

(9) Retract the mast by using ac power (par. 29*c*).

(10) Rotate the mast on the base (par. 17*a*) to be sure it moves freely.

(11) Lower the mast into the A-frame and remove the wind speed transmitter from the top of the mast (par. 32*c*). Replace the wind speed transmitter in its storage case.

(12) Replace the protective cap on the top of the mast.

40. Lubrication

The type of lubricant and the frequency of lubrication for all points to be lubricated are shown in figure 16. The amount of lubricant to be applied to each lubrication point and the method of application are explained in *a* through *g* below.

a. Ac Motor. Place 2 to 4 drops of oil (OE–30) in each oil cup on the ac motor.

b. Front and Rear Leveling Jack Hinges. Apply 6 to 8 drops of oil, (PL Special) to the upper end of the hinge pin on each of the front leveling jacks and to each end of the hinge pin on the rear leveling jack.

c. Front and Rear Leveling Jack Screws.

(1) Carefully wash all grease and dirt from the threaded portion of the jackscrew.

(2) Wipe the jackscrew dry with a clean, dry cloth. Be sure that all grease and dirt has been removed from the jack screw.

(3) Force grease into the grease fitting on the leveling jack threaded sleeve with a standard automotive grease gun, filled with grease (GAA). Force enough grease into the threaded sleeve to force the old grease out of the sleeve and wipe the old grease off the jack with a clean cloth.

(4) Turn the jackscrew in the threaded sleeve to coat the entire length of the thread with a light coat of grease.

(5) Repeat the procedure outlined in (1) through (4) above for each jack.

(6) Tighten the locking rings.

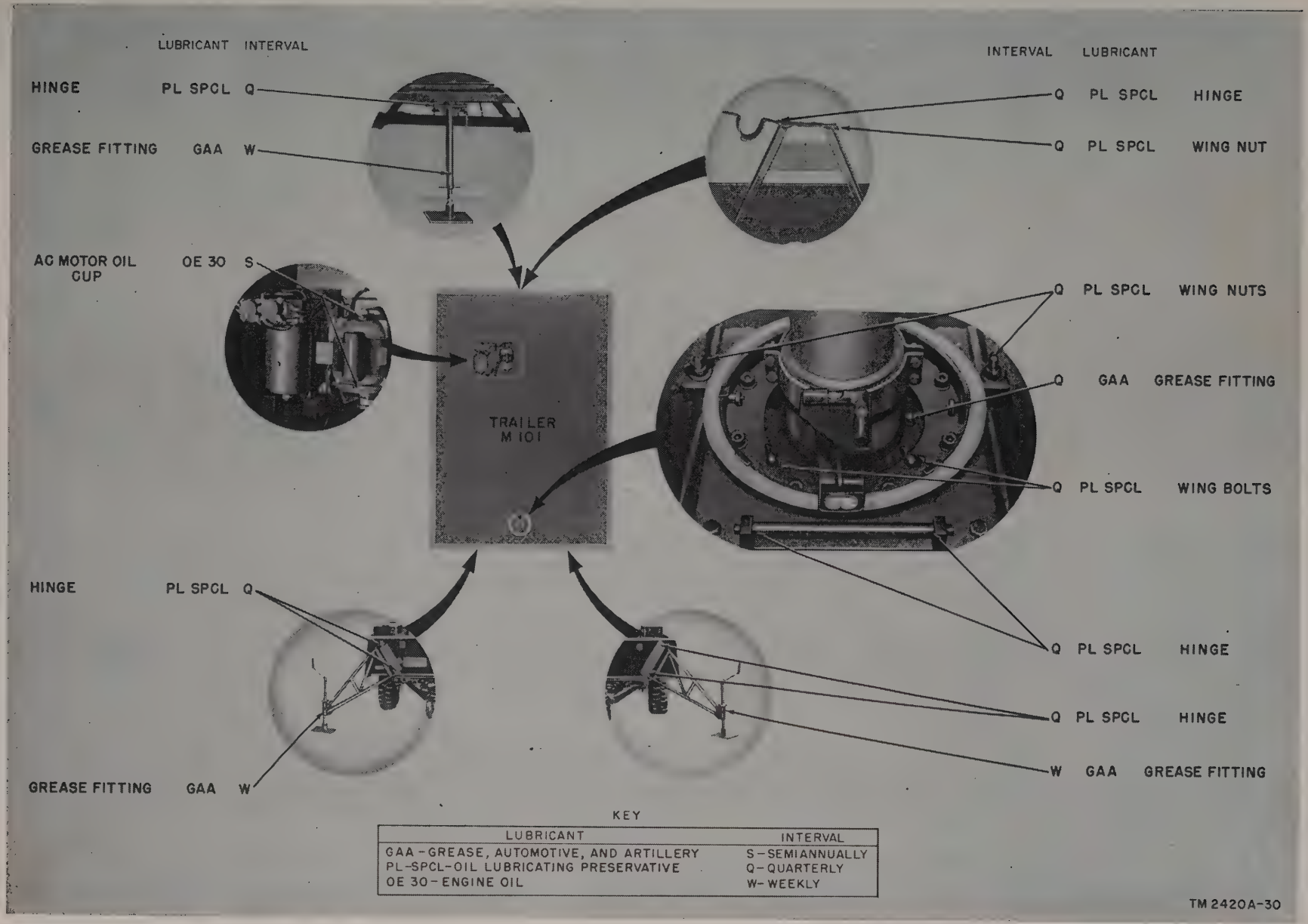


Figure 16. Wind Measuring Set AN/MMQ–1A, lubrication diagram.

d. Wingnut Threads. Apply 2 to 4 drops of oil (PL Special) to the threads of each wing nut.

e. Mast Base Hinge. Apply 2 to 4 drops of oil (PL Special) to each end of the mast base hinge pin.

f. Mast Clamp Hinge. Apply 2 to 4 drops of oil (PL Special) to each end of the mast clamp hinge pin.

g. Mast Base.

(1) Force a small amount (about two strokes with the grease gun) of grease (GAA) into the grease fitting at the base of the mast.

(2) Rotate the mast to spread the grease evenly in the mast base.

h. Power Unit PE–75–AF. Refer to TM 11–900A for the lubrication procedures for the PE–75–AF.

i. Trailer. Refer to TM 9–874A for the lubrication procedures for the trailer.

41. Checking for Excessive Friction

a. Impeller.

(1) Move the wind speed transmitter to a sheltered location where it will be shielded from the wind.

(2) Clamp the wind speed transmitter vertical support (fig. 6) in a vise so that it is in an upright position. *Use a 6-inch, 2 by 4 block on each side of the shaft so that the vise does not mar the surface.*

(3) Tape the small weight (½-inch diameter) to the tip of one of the impeller blades with scotch tape.

(4) Turn the impeller so the weighted blade is 90° from the top vertical position.

(5) Release the impeller; the weighted blade should cause the impeller to rotate until the weighted blade is at the bottom.

(6) Notify the unit repairman if the impeller does not meet this requirement.

(7) Remove the weight from the impeller.

b. Tail Vane.

(1) Clamp the wind speed transmitter in a vise so that the vertical support is in a horizontal position. *Use a 6-inch, 2 by 4 block on each side of the shaft so that the vise will not mar the surface of the shaft.*

(2) Tape the large weight (1-inch diameter) to the rear edge of the tail vane (fig. 6) with scotch tape.

(3) Hold the tail vane in a horizontal position and then release it. The weight should cause the wind speed transmitter to turn on the shaft so that the tail vane moves downward to the vertical position.

(4) Notify the repairman if the tail vane does not meet this requirement.

(5) Remove the weight from the tail vane.

Section II. UNIT REPAIRMAN'S MAINTENANCE

42. Scope of Unit Repairman's Maintenance

The unit repairman replaces the faulty or damaged parts as explained in paragraphs 47 through 51. Some of the parts can be replaced at the installation site; other parts must be replaced at the organizational shop.

43. Tools, Test Equipment, and Materials Required

a. Tools. The following tools are required by the repairman to replace components on the AN/MMQ–1A:

Tools	Size
Tool Equipment TE–33	
Screwdriver TL–358/U	6-inch blade
Open end adjustable wrench	10 inches long
Open end fixed wrench	¾ and $\frac{9}{16}$ inch
Adjustable pipe wrench	10 inches long
Combination pliers	6 inches long
Allen wrench	⅝ inch
Allen wrench	⅜ inch

b. Test Equipment. Multimeter TS–297/U is required for checking electrical circuits.

c. Materials. The materials provided for the repairman are the same as listed for the operator in paragraph 38*a*.

44. Troubleshooting Using Equipment Performance Checklist

a. General. The equipment performance checklist will assist the repairman in locating the faulty component in the wind measuring set. The list gives the item to be checked, the action or condition, the normal indications, and the corrective measures. *To use this list, follow the items in numerical sequence.*

b. Action or Condition. For some items, the action or condition is the setting of switches and controls to a position to permit proper checking of the item. For other items, it is the action that must be taken to obtain the normal indications given in the normal indications column.

c. Normal Indications. The normal indications column lists the indications that the repairman should see when the item is checked. If the indications are not those given, the repairman should apply the corrective measures listed in the corrective measures column.

d. Corrective Measures. The corrective measures are those repairs that can be made by the unit repairman without turning the equipment in for repair. References to paragraphs in field maintenance are for use by field maintenance personnel *only*.

45. Equipment Performance Checklist

	Item No.	Item	Action or condition	Normal indications	Corrective measures
PREPARATORY	1	Wind speed transmitter	Install one mast; connect one end of signal transmission cable (par. 14*c*).		
			Rotate wind speed transmitter (friction test).	Wind speed transmitter moves smoothly.	Check sine-cosine potentiometer (pars. 76–78).
			Rotate impeller (friction test).	Impeller moves smoothly.	Check generator (par. 48*d*).
	2	Mast	Raise mast to upright position (par. 15).		
	3	Front and rear leveling jacks.	Level trailer (par. 16).	Leveling jacks operate freely.	Lubricate leveling jacks (par. 40*b* and *c*).
	4	Mast	Orient mast (par. 17).	Mast turns freely.	Lubricate mast base (par. 40*g*).
	5	Dc power cable	Connect to 24-volt battery in towing vehicle.		
	6	Power unit PE–75–AF	Prepare for operation (par. 21).		
	7	Field wire	Connect short lengths of field wire between binding posts 1, 2, and 3 on terminal box and indicator respectively.		
Equipment Performance			*Operation Using Dc Power*		
	8	LIGHTS switch on control box.	Operate to ON 24V D.C. position.	Lamps light on right and left side at base of mast	Check 24-volt lamps (fig. 42). Check wiring (fig. 42). Check LIGHTS switch.
	9	Oil tank vent valve (green).	Turn to opened position.		
	10	Oil control valve (yellow).	Turn to opened position.		
	11	Oil shutoff valve (blue)	Turn to opened position.		

Item No.	Item	Action or condition	Normal indications	Corrective measures
12	PUMP 24V D.C. switch on control box.	Operate to UP position.	Dc motor starts; mast extends.	Check connections and wiring (fig. 42). Check PUMP 24V D.C. switch. Check dc motor (par. 81). Check dc pump (par. 82). Check relay K1 (par. 51*a*).
13	Oil shutoff valve (blue)	Turn to closed position.	Mast remains fully extended.	Check mast pressure relief valve (par. 52*b*).
14	PUMP 24V D.C. switch	Operate to OFF position.	Dc motor stops.	Check PUMP 24V D.C. switch.
15	Oil shutoff valve (blue)	Turn to open position.	Mast retracts.	Check oil shutoff valve (blue).
16	PUMP 24V D.C. switch	Operate to DOWN position.	Mast retracts.	Check PUMP 24V D.C. switch.
		Operate to OFF position.	Dc motor stops.	Check PUMP 24V D.C. switch.
17	Oil shutoff valve (blue)	Turn to closed position.		
18	Oil control valve (yellow).	Turn to closed position.		
19	LIGHTS switch	Operate to OFF position.	Lights at base of mast go out.	Check LIGHTS switch.
		Operation Using Ac Power		
20	Power unit	Start (par. 29*a*).	Power units starts.	Refer to TM 11–900A.
21	110V A.C. circuit breaker on control box.	Operate to ON position.		
22	LIGHTS switch on control box.	Operate to ON 110V A.C. position.	Lamps light on right and left side at base of mast.	Check 110-volt ac lamps (fig. 42). Check LIGHTS switch. Check 110V A.C. circuit breaker. Check wiring (fig. 42).
23	Oil control valve (red)	Turn to opened position.		
24	Oil shutoff valve (blue)	Turn to opened position.		
25	PUMP 110V A.C. switch on control box.	Operate to UP position.	Ac motor starts; mast extends.	Check connections and wiring (fig. 42). Check PUMP 110V A.C. switch. Check ac motor (par. 80). Check ac pump (par. 82). Check 110V A.C. circuit breaker.
26	Oil shutoff valve (blue)	Turn to closed position.	Mast remains fully extended.	Check mast pressure relief valve (par. 52*b*).
27	PUMP 110V A.C. switch	Operate to OFF position.	Ac motor stops.	Check PUMP 110V A.C. switch (par. 52*b*).
28	Oil shutoff valve (blue)	Turn to opened position.	Mast retracts.	
29	PUMP 110V A.C. switch	Operate to DOWN position.	Mast retracts.	Check PUMP 110V A.C. switch
		Operate to OFF position.	Ac motor stops.	Check PUMP 110V A.C. switch.

Item No.	Item	Action or condition	Normal indications	Corrective measures
30	Oil shutoff valve (blue)	Turn to closed position.		
31	Oil control valve (red)	Turn to closed position.		
32	LIGHTS switch	Operate to OFF position.	Lights at base of mast go out.	Check LIGHTS switch (par. 79*b*).
33	110V A.V. circuit breaker	Operate to OFF position.		
34	Signal transmission cable.	Connect the free end to the terminal box. *Azimuth and Elevation Correction Data Indicator ID–415A/MMQ–1*		
35	LIGHT switch	Operate to ON position.	Panel lights will light.	Check panel lights (par. 47*c*). Check batteries BT7 and BT8 (par. 47*b*).
36	AVERAGE READING-DIRECT READING switch.	Operate to AVERAGE READING position.		
37	MINUTES switch	Rotate to extreme clockwise position.		
38	METER SCALE switches.	Operate to INNER positions.		
39	AZIMUTH (MILS) control.	Operate to extreme clockwise position.		
40	ELEVATION (MILS) control.	Operate to extreme clockwise position.		
41	POWER switch	Operate to ON position; allow to warm up 3 minutes.	Indicator on meters may deflect slightly.	Check POWER switch.
42	FULL SCALE ADJUST-ZERO ADJUST-OPERATE.	Operate to ZERO ADJUST position.		
43	ZERO ADJUST control on left side of main panel.	Adjust until AZIMUTH CORRECTION (MILS) meter indicates 0.	Meter indicates 0.	Check battery BT4 (par. 47*b*). Check amplifier V2 (par. 47*d*).
44	ZERO ADJUST control on right side of main panel.	Adjust until ELEVATION CORRECTION (MILS) meter indicates 0.	Meter indicates 0.	Check battery BT2 (par. 47*b*). Check amplifier V1 (par. 47*d*).
45	BIAS CHECK switch on left side of main panel.	Operate and hold to the down position and proceed to item No. 46.		
46	BIAS ADJUST control on left side of main panel.	If necessary, adjust until AZIMUTH CORRECTION (MILS) meter indicates on red line. Release BIAS CHECK switch. *Note.* If BIAS ADJUST control was adjusted, repeat items No. 38, 39, 41, and 42 until required indications are obtained.	Meter indicates on red line. *Note.* A tolerance of ½ a small scale division is permitted.	Check batteries BT3 and BT4 (par. 47*b*). Check amplifier V2 (par. 47*d*). Check switch S9.
47	BIAS CHECK switch on right side of main panel.	Operate and hold to the down position and proceed to item No. 48.		

EQUIPMENT PERFORMANCE

Item No.	Item	Action or condition	Normal indications	Corrective measures
48	BIAS ADJUST control on right side of main panel.	If necessary, adjust until ELEVATION CORRECTION (MILS) meter indicates 150 mils. Release the BIAS CHECK switch. *Note.* If the BIAS ADJUST control was adjusted, repeat items No. 38, 40, 43, and 44 until required indications are obtained.	Meter indicates 150 mils. *Note.* A tolerance of ½ a small scale division is permitted.	Check batteries BT1 and BT2 (par. 47*b*). Check amplifier V1 (par. 47*d*). Check switch S6.
49	FULL SCALE ADJUST-ZERO ADJUST-OPERATE switch.	Operate to FULL SCALE ADJUST position.		
50	SIG VOLTAGE CHECK switch.	Operate and hold to down position and proceed to item No. 51.		
51	SIG VOLTAGE ADJUST control.	If necessary, adjust until both meters indicate full-scale deflection. Release the SIG VOLTAGE CHECK switch.	AZIMUTH CORRECTION (MILS) meter deflects full scale to right; ELEVATION CORRECTION (MILS) meter deflects full-scale to ELEVATE.	Check batteries BT5 and BT6 (par. 47*b*).
52	FULL SCALE ADJUST control. *Note.* Repeat items Nos. 38 through 40 and 45 through 48 until the desired results are obtained.	If necessary, adjust until both meters indicate full-scale deflection.	AZIMUTH CORRECTION (MILS) meter deflects full scale to right; ELEVATION CORRECTION (MILS) meter deflects full scale to DEPRESS.	
53	FULL SCALE ADJUST-ZERO ADJUST-OPERATE switch.	Operate to the OPERATE position.	Both meters will indicate according to the information received from the wind speed transmitter.	
54	AZIMUTH (MILS) control.	Rotate from 888 to 200.	Meter indicator decreases accordingly.	Check potentiometer R16.
		Rotate from 200 to 888.	Meter indicator increases accordingly.	Check potentiometer R16.
55	ELEVATION (MILS) control.	Rotate from 888 to 200.	Meter indicator decreases accordingly.	Check potentiometer R3.
		Rotate from 200 to 888.	Meter indicator increases accordingly.	Check potentiometer R3.
56	MINUTES control		Azimuth and elevation meters deflect to full scale, restore to input signal in:	
		Operate to ½ position.	½ minute.	Check resistor R6 or R21 and capacitor C1 or C7.

	Item No.	Item	Action or condition	Normal indications	Corrective measures
EQUIPMENT PERFORMANCE			Operate to 1 position.	1 minute.	Check capacitor C2 or C8.
			Operate to 2 position.	2 minutes.	Check capacitor C3 or C9.
			Operate to 4 position.	4 minutes.	Check capacitor C4 or C10.
			Operate to 5 position.	5 minutes.	Check capacitor C5 and C6 or C11 and C12.
	57	METER SCALE switch	Operate to INNER position.	Azimuth and elevation meter indications are doubled.	Check resistor R5 for elevation; R19 for azimuth.
			Operate to OUTER position.	Azimuth and elevation meter indications are reduced to half.	Check resistor R2 for elevation; R15 for azimuth.
STOP	58	LIGHT switch on indicator.	Operate to OFF position.	Panel lights extinguish.	Check LIGHT switch.
	59	POWER switch on indicator.	Operate to OFF position.	Indicators on meters will return to 0 positions.	Check POWER switch.

46. Troubleshooting Chart.

Note. The corrective measures listed in the following troubleshooting chart are those that can be performed by the unit repairman. If these corrective measures do not correct the trouble, repair at a higher echelon of maintenance is required.

a. Signal Transmission.

Symptom	Probable trouble	Correction
1. Impeller rotates but no output from generator.	a. Generator brushes worn.	a. Replace generator brushes (par. 48*d*).
	b. Dirty generator commutator.	b. Clean generator commutator (par. 48*d*).
	c. Broken wire in generator.	c. Replace wind speed transmitter (par. 14).
2. Impeller does not rotate properly.	a. Impeller off balance.	a. Replace impeller (par. 48*a*).
	b. Worn or damaged generator bearings.	b. Replace generator (par. 48*d*).
3. Wind speed transmitter does not rotate in azimuth.	a. Damaged sine-cosine potentiometer.	a. Replace wind speed transmitter (par. 14).
	b. Damaged tail vane.	b. Replace tail vane (par. 48*b*).
	c. Damaged or worn bearings.	c. Replace wind speed transmitter (par. 14).
4. Wind speed transmitter not balanced.	a. Chipped impeller blade.	a. Replace impeller (par. 48*a*).
	b. Damaged tail vane.	b. Replace tail vane (par. 48*b*).
5. Generator output not indicating on meters of indicator.	a. Defective connection at wind speed transmitter.	a. Reconnect signal transmission cable (par. 14*c*).
	b. Defective signal transmission cable.	b. Repair or replace signal transmission cable.
	c. Defective connection at terminal box.	c. Reconnect signal transmission cable (par. 30*c*).
6. Meter M1 (ELEVATION (MILS)) on indicator cannot be adjusted to zero.	a. Tube V1 defective.	a. Replace tube V1 (par. 47*d*).
	b. Defective connections at battery BT1 or BT2.	b. Reconnect battery (par. 47*b*).
	c. Defective battery BT1 or BT2.	c. Replace battery (par. 47*b*).

Symptom	Probable trouble	Correction
7. Meter M2 (AZIMUTH (MILS)) cannot be adjusted to zero.	a. Tube V2 defective.	a. Replace tube V2 (par. 47*d*).
	b. Defective connections at battery BT3 or BT4.	b. Reconnect battery (par. 20).
	c. Defective battery BT3 or BT4.	c. Replace battery (par. 47*b*).
8. All panel lights on indicator out or dimly lighted.	a. Defective connections at battery BT7 or BT8.	a. Reconnect battery (par. 20).
	b. Defective battery BT7 or BT8.	b. Replace battery (par. 47*b*).
9. Single panel light on indicator fails to light.	Defective lamp.	Replace lamp (par. 47*c*).
10. Meter M1 or M2 cannot be adjusted to full-scale deflection.	a. Defective connection at battery BT5 or BT6.	a. Reconnect battery (par. 20).
	b. Defective battery BT5 or BT6.	b. Replace battery (par. 47*b*).
11. Bias cannot be adjusted for tube V1.	Defective battery BT2.	Replace battery (par. 47*b*).
12. Bias cannot be adjusted for tube V2.	Defective battery BT4.	Replace battery (par. 47*b*).

b. Hydraulic System.

Symptom	Probable trouble	Correction
1. Oil leaks from mast at mast section joints.	a. Mast oil seal damaged.	a. Replace mast oil seal (par. 49).
	b. Excessive oil pressure in mast.	b. Turn in equipment for repair.
2. Mast section cannot be raised or lowered.	a. Damaged mast section.	a. Replace mast section (par. 49).
	b. Mast section dirty or corroded.	b. Clean the mast section (par. 49).
3. Mast fails to remain extended.	a. Defective mast pressure relief valve.	a. Replace mast pressure relief valve (par. 52*b*).
	b. Defective oil shutoff valve (blue).	b. Replace oil shutoff valve (blue) (par. 52*a*).
4. Mast fails to extend with one pump but extends with the other pump.	Defective pump.	Turn in equipment for repair.
5. Oil leaks at hose connections.	a. Loose hose connections.	a. Tighten hose connections (par. 50).
	b. Hose cracked or broken.	b. Replace hose.
6. Mast cannot be fully extended.	Insufficient oil.	Add oil.
7. Oil leaks at shutoff valve stem.	a. Loose packing nut.	a. Tighten packing nut (par. 50).
	b. Insufficient packing.	b. Add packing.
8. Mast cannot be turned in azimuth when in the upright position.	Insufficient lubrication.	Lubricate the mast base (par. 40*a*).
9. Single mast section fails to extend or retract properly.	a. Mast vent hole clogged.	a. Clean mast vent holes.
	b. Dirty mast section.	b. Clean mast section.
10. Ac motor fails to start.	a. Ac power cord not connected.	a. Connect ac power cord.
	b. Damaged ac power cord.	b. Repair or replace ac power cord.
	c. Defective motor start capacitors.	c. Replace ac motor start capacitors (par. 51*b*).
11. Dc motor fails to start.	a. Dc power cable not properly connected.	a. Reconnect dc power cable.
	b. Relay K1 defective.	b. Replace relay K1 (par. 51*a*).

47. Indicator, Replacement of Batteries, Panel Lamps, and Tubes

a. General. To replace the batteries, panel lamps, or tubes in the indicator, open the indicator panel (fig. 3) as follows:

(1) Loosen the 10 thumbscrews that secure the panel to the carrying case.

(2) Carefully swing the panel forward on its hinges and lay it in front of the carrying case.

b. Replacement of Batteries. Disconnect and remove the worn out batteries from the indicator and install new batteries as explained in paragraph 20.

c. Replacement of Panel Lamps (fig. 27).

(1) Loosen the knurled nut that secures the panel lamp socket to the mounting bracket. Do not remove the nut.

(2) Slide the panel lamp socket out until it clears the panel.

(3) Swing the panel lamp socket upward to expose the lamp.

(4) Press in on the panel lamp, turn it counterclockwise, and then pull it out of the panel lamp socket. Discard the defective lamp.

(5) Install the new lamp by reversing the procedures given in (1) through (4) above. Be sure the knurled nut is securely tightened.

d. Replacement of Tubes V1 and V2 (fig. 27).

(1) *Carefully* insert a small screwdriver between the bottom of the tube and the tube socket.

(2) *Carefully* raise the tube vertically from the tube socket and shield until it can be grasped with the fingers.

(3) Clip the wire pins of the new tube so they are about ⅜-inch long and straighten the pins. Be careful not to break the wire pins or the glass envelope.

(4) Aline red dot on the tube with the red dot on the tube socket and slide the new tube into the socket. Look through the slot in the side of the tube shield to check the alinement of the wire pins with the tube socket. *Be sure each wire pin slides into the socket and is not bent.*

48. Disassembly of Wind Speed Transmitter for Organizational Maintenance

a. Removal of Impeller.

(1) Remove the rubber nose cap (1, fig. 17).

(2) Unscrew the captive thumb nut (3) to release the impeller (2).

b. Removal of Tail Vane. To remove the tail vane, perform *a*(1) and (2) above and proceed as follows:

(1) Remove the three machine screws (4) from the shield (5). Slide the shield and cover (6) from the speed mechanism assembly (7).

(2) Unscrew the two hexagonal nuts (8) and remove the lockwashers (9) that secure the tail vane (16) and speed mechanism assembly (7) to the center section assembly (13).

(3) Remove the speed mechanism assembly (7) and pull it forward to expose the capacitor assembly (10) and brush assembly (11) which contact the collector rings (18).

Note. Avoid turning or twisting the speed mechanism assembly (7) when removing it to prevent damage to the collector ring brush assembly (11).

(4) Remove the tail vane (16) and studs (15) by pulling the tail vane from the center section assembly (13).

(5) Unscrew the nuts and remove the lockwashers that secure the studs (15) to the tail vane (16).

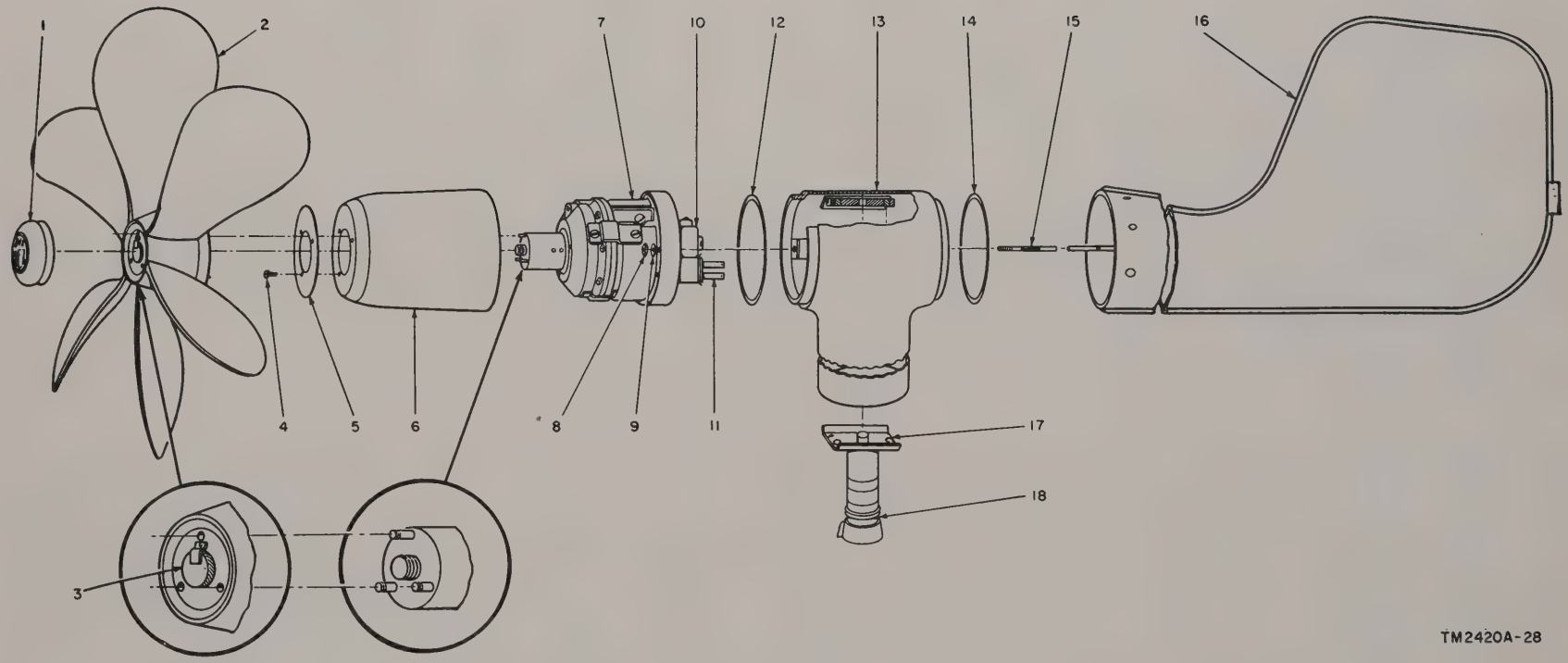
(6) Remove the two rubber gaskets (12 and 14) from the center section assembly (13).

c. Removal of Vertical Support. To reach the collector rings on the vertical support, for cleaning, perform *a* and *b* above and proceed as follows:

(1) Unscrew the two cap screws (inside the center section assembly (13)) that secure the mounting plate (17) to the center section assembly (13).

Note. One cap screw can be reached from each side of the center section assembly.

(2) Remove the vertical support by sliding it from the center section assembly (13) to expose the collector rings (18).



1	Rubber nose cap	7	Speed mechanism assembly	13	Center section assembly
2	Impeller	8	Hexagonal nut	14	Rubber gasket
3	Captive thumb nut	9	Lockwasher	15	Studs
4	Machine screw	10	Capacitor assembly	16	Tail vane
5	Shield	11	Collector ring brush	17	Mounting plate
6	Cover	12	Rubber gasket	18	Collector ring

Figure 17. Wind Speed Transmitter T–610/MMQ–1A, exploded view.

d. Wind Speed Mechanism Disassembly. Failure due to worn, dirty or broken brushes, dirty commutator segments of the armature, or connections in the wiring can be remedied without completely disassembling the generator or disturbing the magnetism which will upset the calibration of the generator. *Do not disassemble the generator beyond the steps outlined below for maintenance at organizational level.*

(1) Loosen the two setscrews (1, fig. 18) and remove the impeller holder (2).

(2) Remove the generator (6) from the generator holder (26) by unscrewing the two roundhead screws (3) and removing the lockwashers (4).

(3) Remove the two wires from the sides of the generator by unscrewing the two hexagonal terminal nuts (5). Tag each terminal with the color of the wire removed.

(4) Remove the weight holder (24) and balance weight (25) by unscrewing the two roundhead screws (22) and lockwashers (23).

(5) Remove the brush plate bracket (13) by unscrewing the two roundhead screws (9), lockwashers (8), and hexagonal nuts (7).

(6) Remove the filter clip (12), insulating plate (14), and brush plate assembly (15) by unscrewing the two roundhead screws (17), flat washers (16), lockwashers (11), and hexagonal nuts (10).

(7) Remove the generator cover plate (20) and filter (21) by unscrewing the four roundhead screws (18) and lockwashers (19) to expose the generator brush assembly.

(8) Remove the generator brush assembly as follows:

(*a*) Pull the retaining pin out and unscrew the screw pin (fig. 19).

(*b*) Loosen the two screws on top of the brush assembly and detach the connector straps. Remove the brush assembly from the generator.

(9) Clean or replace the brush assembly. Clean the commutator segments and slots with clean, lint-free cloth. Use a sharp piece of wood to hold the cloth against the commutator and rotate the shaft by hand. Wipe the commutator segments and slots until no further soiling of the cloth results.

e. Reassembly. To reassemble the wind speed transmitter and its parts, reverse the procedures outlined in *a* through *d* above.

Note. When replacing the brush assembly, be sure that the red dot on the brush assembly mates with the red dot on the generator case. The screw pin must not bind and the brush assembly must be free to rock when the screw pin is firmly seated.

49. Disassembly and Reassembly of Mast for Organizational Maintenance (fig. 20)

a. Drain the oil from the mast (par. 33*c*).

b. Lower the mast to the A-frame (par. 32*c* (3)), and check to see that the trailer wheel brakes are set.

c. Raise the towing end of the trailer until the mast is level.

Note. A crane or chain hoist may be used on the lunette of the trailer.

d. Block the tailgate end of the trailer to prevent it from tipping lower.

e. Block the front support leg at the desired height.

f. Remove the protective cap from the adapter on the mast.

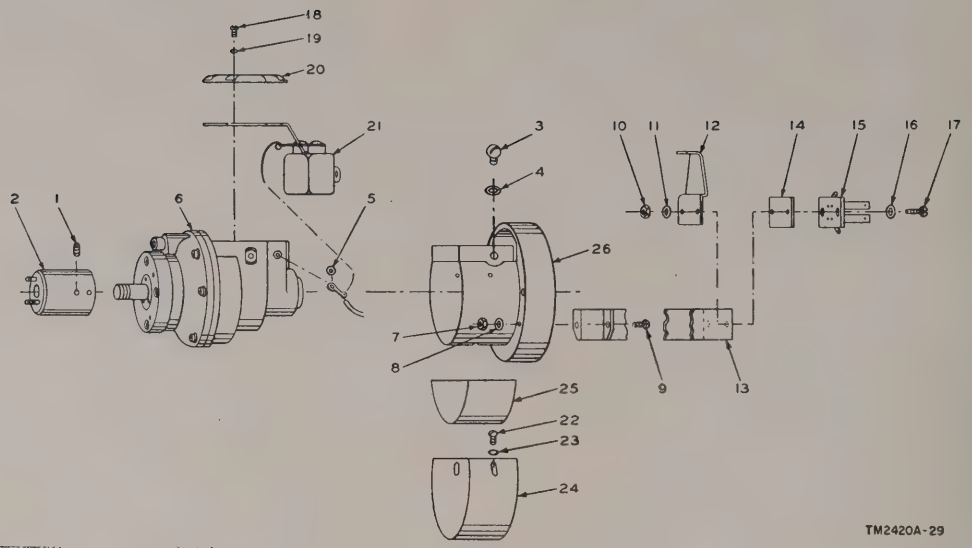
g. Remove the six fillister-head screws that secure the adapter, retaining plate, and upper guy ring to the top collar. Pull the adapter, retaining plate, and upper guy ring from the top mast section.

h. Remove the three cap screws that secure the guy ring mounting to the top section. Pull the guy ring mounting from the top mast section.

i. Remove the four cap screws in the collar that secure the top section to the adjacent (next larger) section.

Note. Some oil always clings to the mast sections and makes them hard to handle. Have several clean, dry rags available before starting to disassemble the mast. Protect the exposed mast sections from contact with sand or dirt by covering them with cloth.

j. Grasp the top mast section with a dry cloth and pull it straight out. If necessary, tap the collar gently with a soft-faced hammer to separate the sections. Support the weight of the section being



1	Setscrew	10	Hexagonal nut	19	Lockwasher
2	Impeller holder	11	Lockwasher	20	Cover plate
3	Roundhead screw	12	Filter clip	21	Filter
4	Lockwasher	13	Brush plate bracket	22	Roundhead screw
5	Hexagonal terminal nut	14	Insulating plate	23	Lockwasher
6	Generator	15	Collector ring brush assembly	24	Weight holder
7	Hexagonal nut	16	Flatwasher	25	Balance weight
8	Lockwasher	17	Roundhead screw	26	Generator holder
9	Roundhead screw	18	Roundhead screw		

Figure 18. Wind speed tranmitter mechanism, exploded view.

removed to prevent damage to the equipment. The stop ring of the section being removed will force the collar to leave the end of the adjacent (next larger) section.

k. Repeat the procedure in *i* and *j* above for the remaining five removable mast sections.

Note. The upper three mast collars that link the mast sections have four cap screws each. The lower three collars have eight cap screws.

l. Remove a collar from a mast section as follows:

(1) Slide the neoprene bumper ring from the mast section.

(2) Unscrew the two plunger spring retaining screws that project from the side of the collar.

(3) Pull the two plunger springs and plungers from the collar.

(4) Slide the collar off the mast section.

m. Remove an oil seal as follows:

(1) Remove the clamping screw and lockwasher by using the 5/8-inch allen wrench.

(2) Remove the clamping plate, oil seal expander spring, and oil seal from the tube head of the mast section.

(3) Reassemble the oil seal by reversing the procedure in (1) and (2) above.

n. Remove the stationary mast section and mast base from the trailer as follows:

(1) Disconnect the oil hose from the oil shutoff valve (blue) (par. 52*a*).

(2) Remove one cotter pin from the shaft of the hinge on the mast base plate.

(3) Pull the shaft from the hinge.

(4) Lift the stationary section of the mast and mast base from the mast base trailer plate.

o. Remove the peep sight, rotating handle, and mil scale pointer from the stationary section of the mast as follows:

(1) Remove the wingnut and take the peepsight off the stationary section of the mast (fig. 20).

(2) Remove the wingnut and take the rotating handle off the stationary section of the mast.

(3) Remove the four retaining bolts (fig. 22) and take the mil scale pointer off the stationary section of the mast.

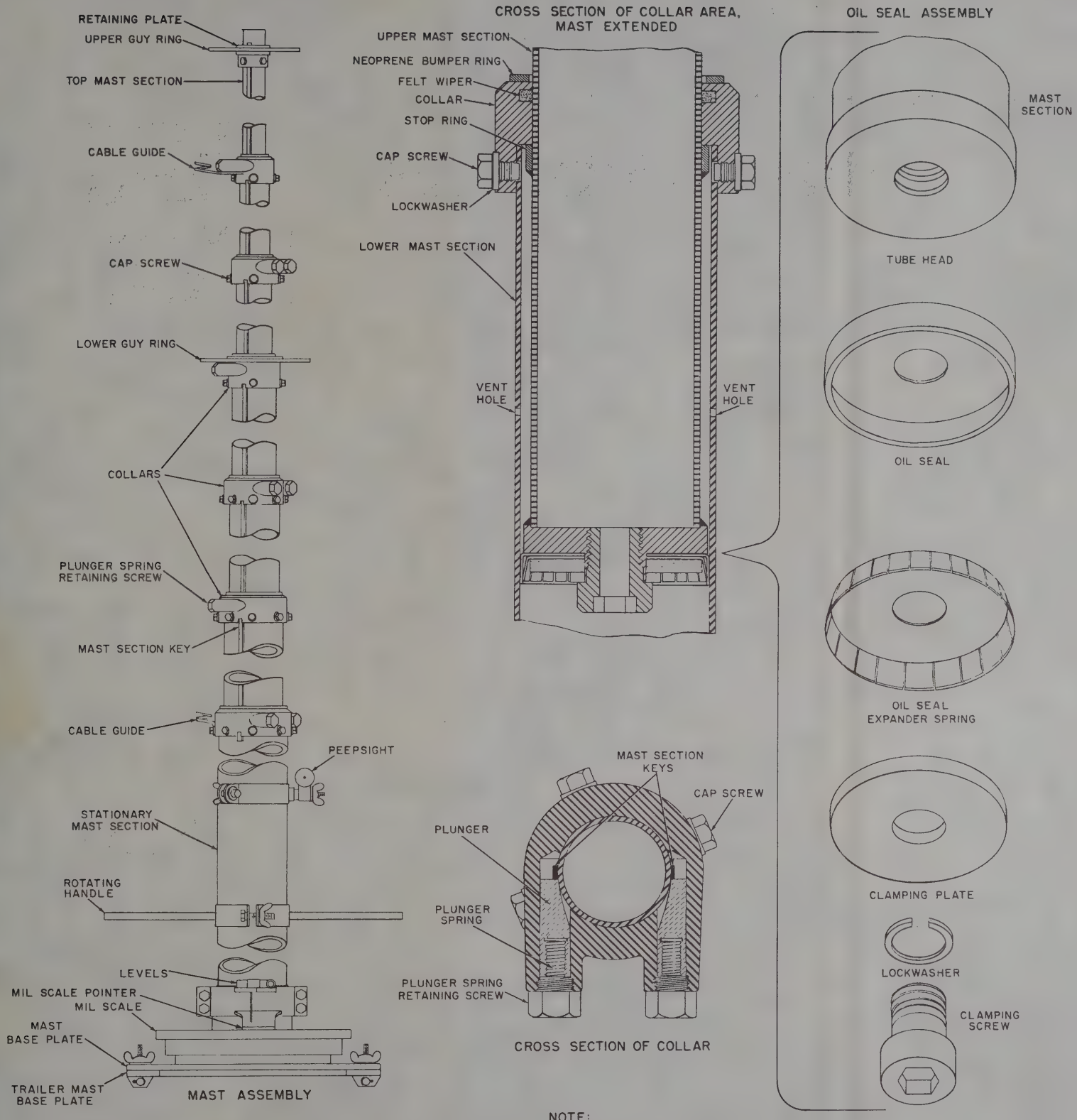


Figure 20. Mast AB–329A/G, sectional view.

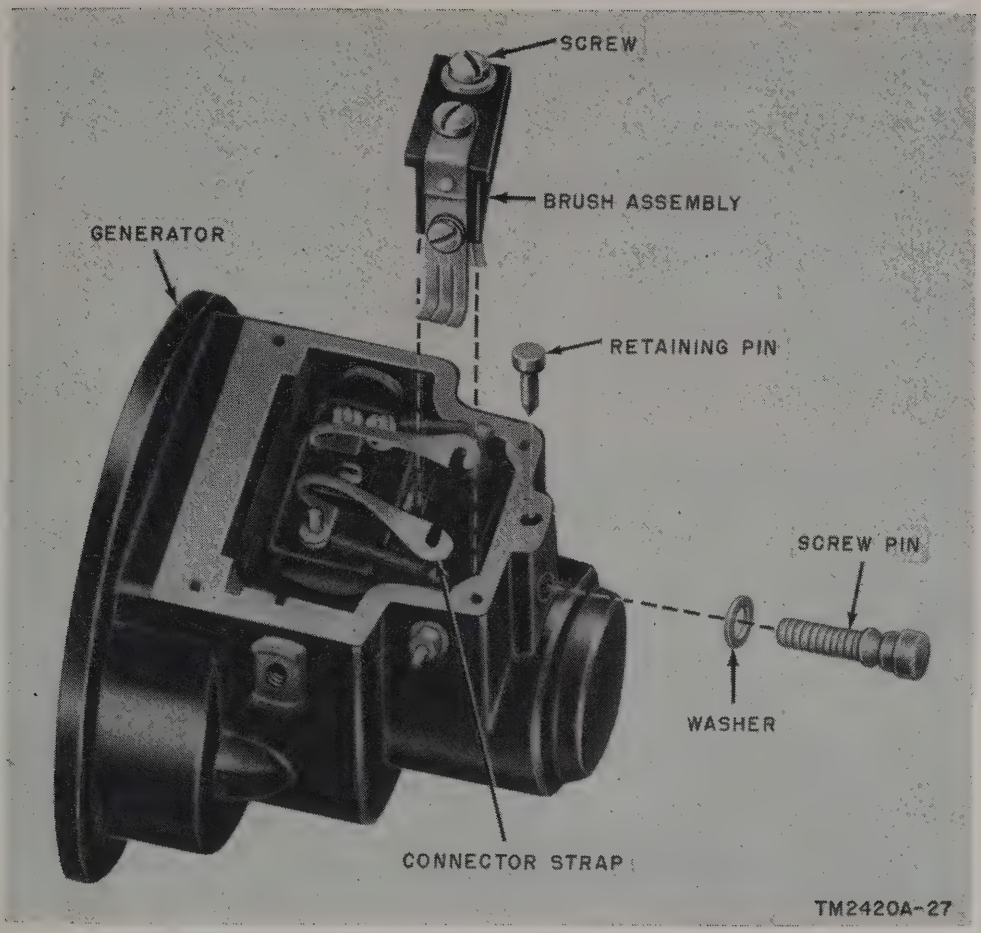


Figure 19. Generator with cover off, showing brush assembly.

p. Remove the mil scale as follows:

(1) Remove the screws from the four retaining blocks (fig. 22) and remove the retaining blocks.
(2) Remove the two mil scale locking screws.
(3) Remove the two stop blocks.
(4) Lift the mil scale from the mast base.

q. Replace a defective oil seal as follows:

(1) Remove the affected mast section with all the smaller sections inside. Be sure to support the weight of these sections as they are being withdrawn from the next larger section.
(2) Replace the defective seal (*m* above).
(3) Replace the affected section.

r. To reassemble the mast and its parts, reverse the procedures outlined in *b* through *q* above. Each mast section has two keys 180° apart. One key is longer than the other and engages a notch in the edge of the mast collar to provide positive alinement during reassembly.

Caution: Be careful not to damage the felt wiper rings in the mast collar during reassembly.

50. Tightening Hose Clamps and Oil Control Valve Packing Nuts

a. Hose Clamps (fig. 22). Before tightening the hose clamp to stop a connection from leaking, be sure the hose is not cracked or broken. If the hose is in good condition, tighten the hose clamp with a screwdriver. Do not tighten the hose clamp more than is necessary to stop the leak.

b. Packing Nut. Tighten the packing nut on the oil control valve when the valve is leaking around the valve stem. Tighten the nut only enough to stop the leak.

51. Replacement of Relay K1 Assembly and Ac Motor Start Capacitor (fig. 21)

a. Relay K1 Assembly.

(1) Open the cover of the motor and pump box.

(2) Tag and disconnect the leads connected to relay K1 assembly.
(3) Remove the mounting bolts with a wrench of the proper size.
(4) Lift relay K1 assembly from the mounting bracket.
(5) Position a new relay K1 assembly on the mounting bracket and reassemble the parts by reversing the procedure outlined in (1) through (3) above.

b. Ac Motor Start Capacitor.
(1) Open the cover of the motor and pump box.
(2) Remove the ac motor start capacitor and lift it from the top of the ac motor.
(3) Tag and disconnect the ac motor start capacitor leads. Discard the defective ac motor start capacitor.
(4) Connect the leads of the new ac motor start capacitor to the ac motor and reassemble the parts as outlined in (1) through (3) above.

52. Replacement of Oil Control Valves

Extend and retract the mast as explained in paragraph 28 or 29. After any valve has been replaced, be sure that none of the connections leak.

a. Oil Shutoff Valve (Blue) (fig. 22).
(1) Disconnect the oil hose.
(2) Unscrew the oil hose fitting from the upper tee.

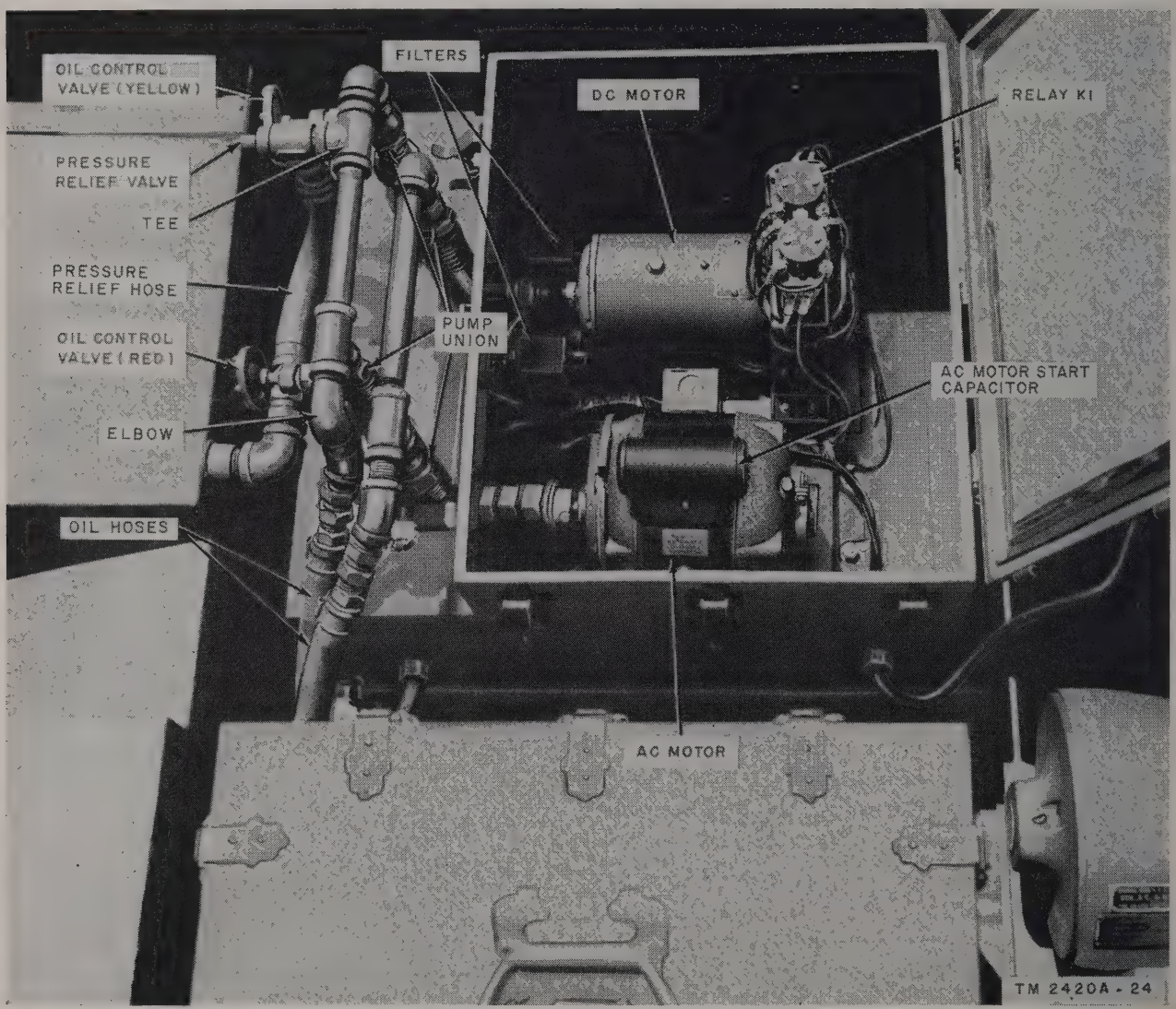


Figure 21. Pump and motor box, interior view.

(3) Remove the retaining clamp from the oil shutoff valve body.
(4) Unscrew the gland nuts from the upper tee and the mast pressure relief valve and remove the copper tubing.
(5) Loosen the packing nut and unscrew the oil shutoff valve stem assembly from the oil shutoff valve body.
(6) Turn the connection in the base of the mast so the assembly is approximately 45° from vertical.
(7) Unscrew the upper tee and the oil shutoff valve from the long nipple.
(8) Unscrew the upper tee and the close nipple from the oil shutoff valve.
(9) Discard the defective oil shutoff valve.
(10) Install a new oil shutoff valve by reversing the procedures in (1) through (8) above. Be sure that all connections are tightened securely.
(11) Paint the new valve the same color as the valve that was removed.

b. Mast Pressure Relief Valve (fig. 22).

(1) Unscrew the two gland nuts and remove the copper tubing.

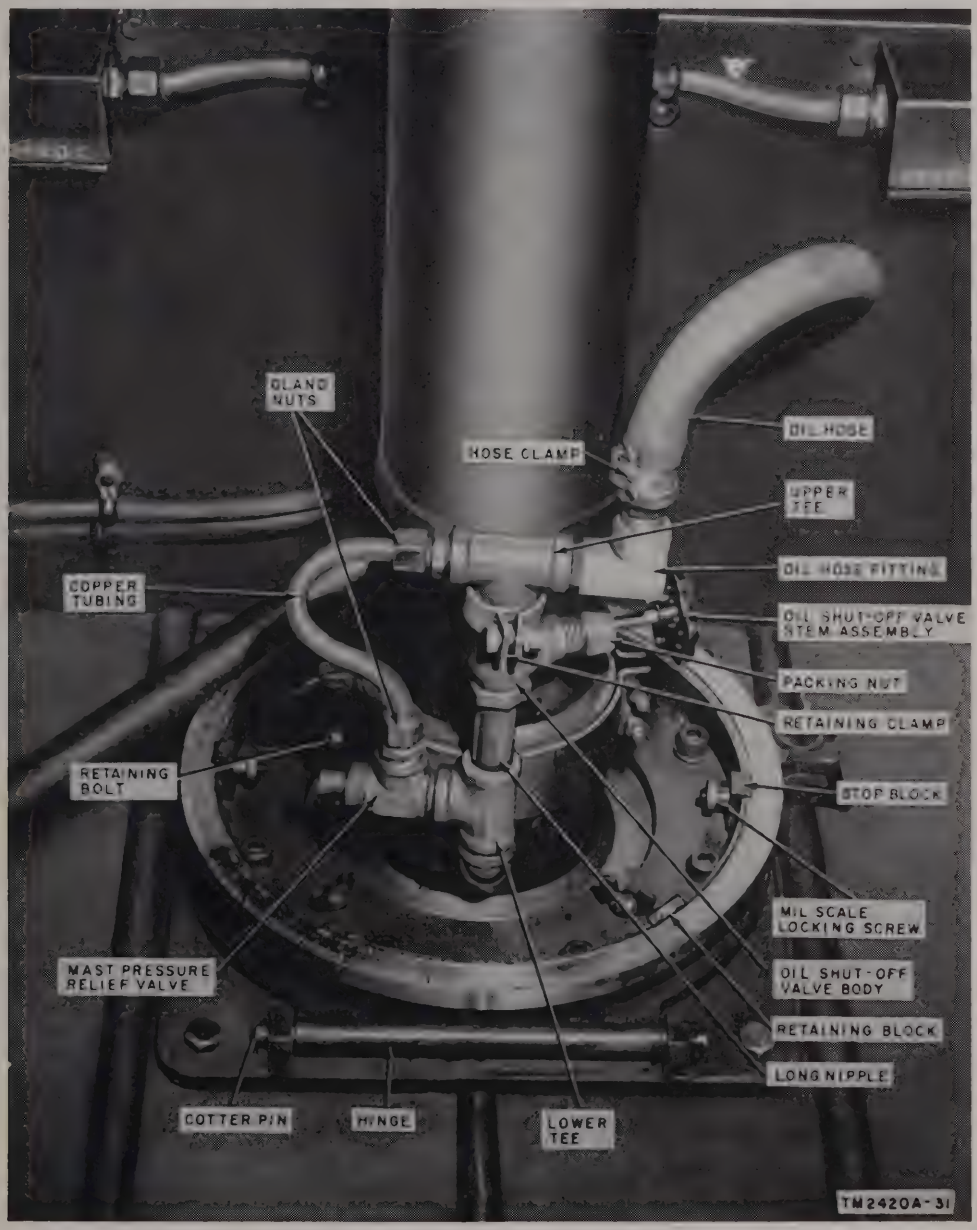


Figure 22. Mast base, mast pressure relief valve, and oil shutoff valve (blue).

(2) Unscrew the mast pressure relief valve from the lower tee.

(3) Remove the gland nut from the valve and discard the defective valve.

(4) Install the new valve by reversing the procedures given in (1) and (2) above. Be sure that all connections are tightened securely.

c. Pressure Relief Valve (fig. 21).

(1) Disconnect the pressure relief hose from the pressure relief valve.

(2) Unscrew the pressure relief valve from the tee. Remove the hose fitting from the valve. Discard the defective valve.

(3) Install the new pressure relief valve by reversing the procedure given in (1) and (2) above.

d. Oil Control Valve (Yellow) and Oil Control Valve (Red) (fig. 21).

(1) Disconnect the pressure relief hose from the pressure relief valve and disconnect the oil hose from the elbow connection.

(2) Unscrew the retaining nut on each of the pump unions and lift the oil control valve assembly from the motor and pump box.

Caution: Loosen only the connections necessary to replace the defective oil control valves.

(3) Replace the oil control valve (yellow) as follows:

(*a*) Unscrew the union and the short nipple from the oil control valve (yellow).

(*b*) Unscrew the oil control valve (yellow) from the nipple in the elbow. Be careful not to damage the nipple. Discard the defective oil control valve (yellow).

(*c*) Install the new oil control valve (yellow) by reversing the procedure given in (*a*) and (*b*) above.

(4) Replace the oil control valve (red) as follows:

(*a*) Unscrew the union and the nipple from the oil control valve (red).

(*b*) Unscrew the oil control valve (red) from the nipple in the tee. Discard the defective oil control valve (red).

(*c*) Install the new oil control valve (red) by reversing the procedure given in (*a*) and (*b*) above.

(5) Replace the oil control valve assembly by reversing the procedure given in (1) and (2) above.

(6) Paint the new valve the same color as the valve that was removed.

CHAPTER 5
THEORY

Section I. TRANSMISSION CIRCUIT

53. General

a. Wind Measuring Set AN/MMQ–1A converts components of surface winds into electrical voltages. These voltages are transmitted through an interconnecting cable to an indicator. The indicator converts these voltages to meter indications in mils for direct reading. These indications are used for elevation and azimuth corrections that must be made to compensate for the effects of surface winds.

b. To describe the theory of operation of the wind measuring set, the equipment has been divided into the transmission circuit and the hydraulic system. The detailed theory of the transmission circuit is given in paragraphs 54 through 56. The detailed theory of the hydraulic system is given in paragraphs 57 through 60.

54. Transmission Circuit, Block Diagram Analysis
(fig. 23)

The wind measuring set includes a wind speed transmitter and an indicator. The wind speed transmitter transmits a generated voltage that is applied as two signals to the indicator. The indicator receives the transmitted signals and provides elevation and azimuth correction data.

a. Wind Speed Transmitter. The wind speed transmitter includes an impeller, tail vane, generator, and sine-cosine potentiometer. Detailed theory for the wind speed transmitter is given in paragraph 55.

(1) The generator is driven by the impeller. The output voltage of the generator is connected to the sine-cosine potentiometer and will vary according to the wind speed.

(2) The tail vane, which turns with the direction of the wind, is mechanically connected to the sine-cosine potentiometer.

(3) The sine-cosine potentiometer provides separate elevation and azimuth information for the indicator.

b. Indicator. The indicator is a dual-purpose instrument which receives the information from the wind speed transmitter. The information is applied to two separate circuits; the elevation and azimuth circuits. Each circuit contains an amplifier and meter. The meters are calibrated to indicate azimuth and elevation correction data in mils. Detailed theory for the indicator is given in paragraph 56.

55. Wind Speed Transmitter
(fig. 24)

Dc generator G1 developes an open circuit voltage of 6 volts dc at 1,000 revolutions per minute (rpm) and has an internal resistance of 200 ohms. The generator turns at a speed directly proportional to the speed of the wind. The sine-cosine potentiometer, mechanically connected to the wind vane, combines the measurements of wind speed and direction to produce mils per miles per hour wind corrections at the indicator.

a. Input to Sine-cosine Potentiometer. The output from generator G1 is applied to parallel-connected terminals 2 and terminals 4 of the sine-cosine potentiometer. The transmitted voltages are determined by two wipers set 90° apart, which rotate under direct control of the tail vane.

b. Output From Sine-Cosine Potentiometer. The output voltages of the sine-cosine potentiometer are extended through the signal transmission cable and field wire to the indicator. The two terminals 1 and the two terminals 3 on the sine-cosine potentiometer are connected in parallel and extended as a common lead through B of the signal transmission cable, terminal 2 of the terminal box, and field wire (one twisted pair connected together) to terminal 2 of the indicator. The out-

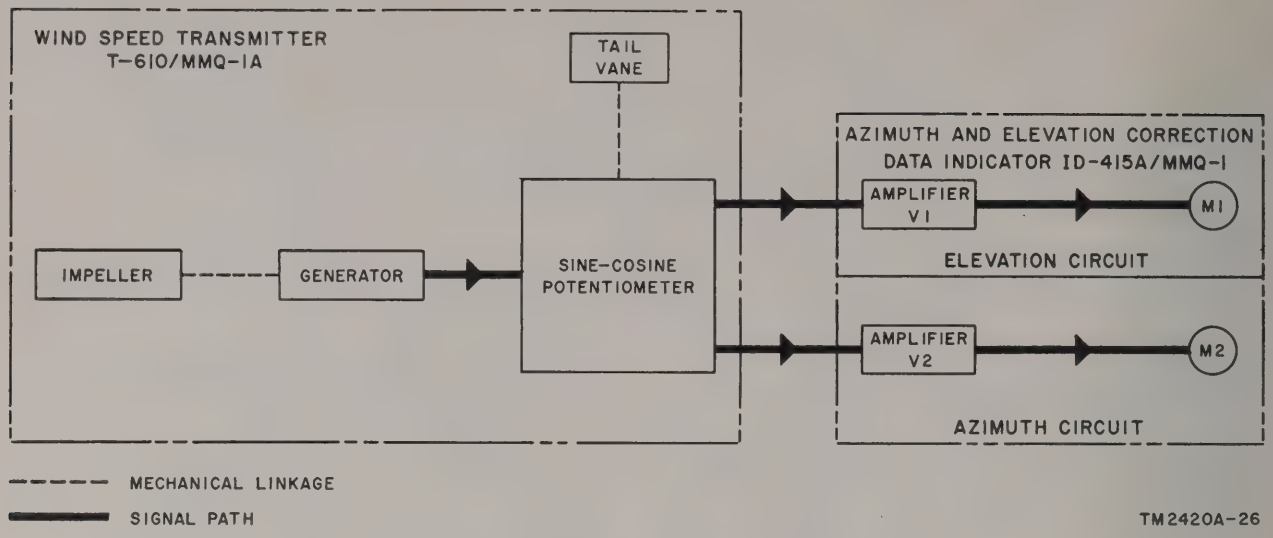


Figure 23. Transmission circuit, block diagram.

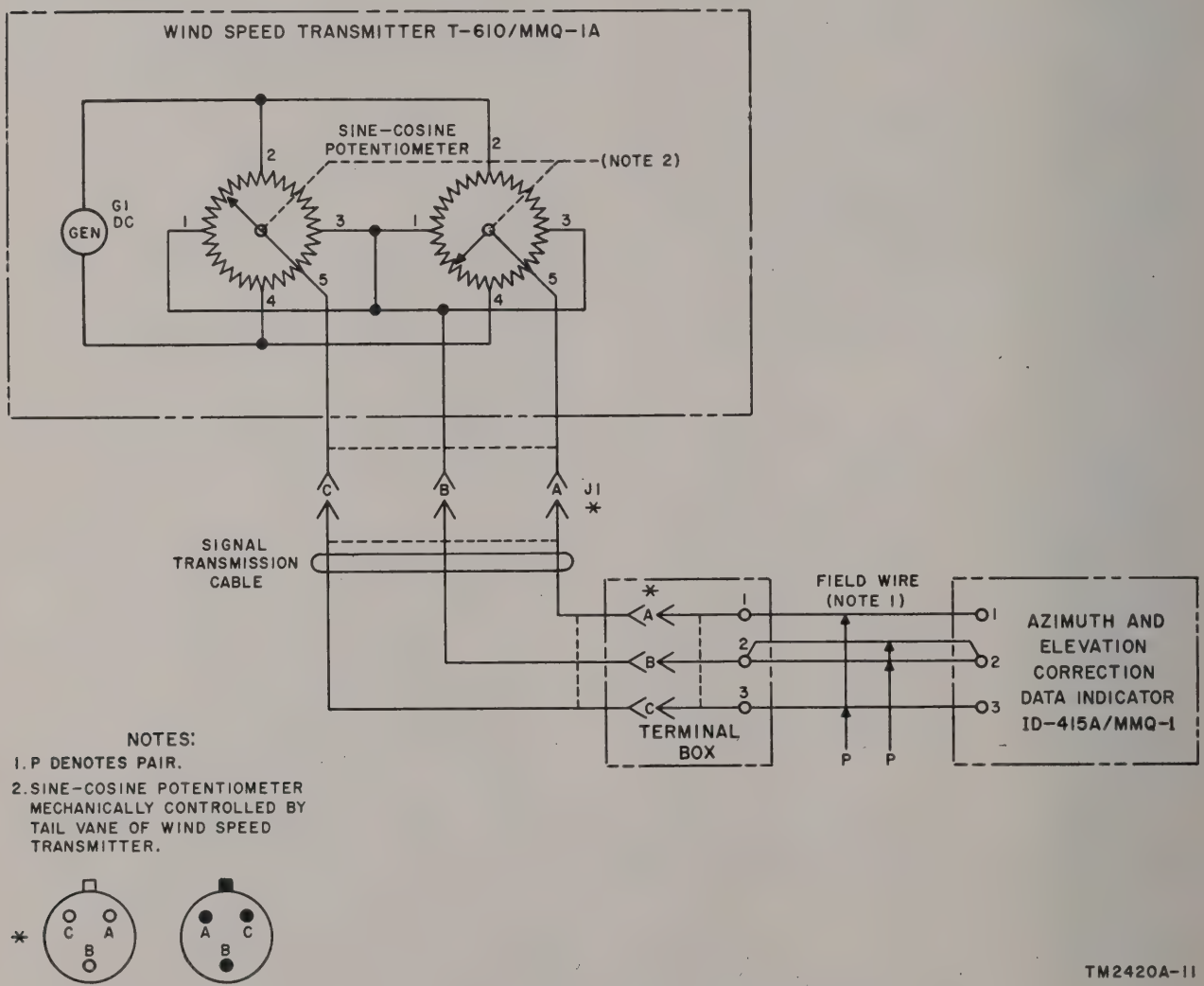


Figure 24. Transmission circuit, schematic diagram.

put for the elevation circuit is from terminal 5 of one section of the sine-cosine potentiometer through A of the signal transmission cable, terminal 1 of the terminal box, and field wire to terminal 1 of the indicator. The output for the azimuth circuit is from terminal 5 of the other section of the sine-cosine potentiometer through C of the signal transmission cable, terminal 3 of the terminal box, and field wire to terminal 3 of the indicator.

56. Azimuth and Elevation Correction Data Indicator ID–415A/MMQ–1 (fig. 31)

The indicator indicates azimuth and elevation correction data in mils. This information is used in compensating for the effects of surface winds. The indicator contains four circuits: the azimuth circuit (*a* below), elevation circuit (*a* below), test voltage circuit (*b* below), and panel lighting circuit (*c* below).

Note. The functions of the controls, switches, and meters are given in paragraph 25.

a. Azimuth and Elevation Circuits. The input signal is applied across terminals 1 and 2 for the elevation circuit and across terminals 2 and 3 for the azimuth circuit. Terminal 2 is common to both circuits. The azimuth and elevation circuits are functionally the same. Only the azimuth circuit will be discussed in detail.

(1) *Input to amplifier V2.* When switch S1 is in the OPERATE position, switch S2 is in the AVERAGE READING position, and switch S8 is in the OUTER position, the input signal is applied from binding post 3 through contacts 11–7 of switch S1, contacts 3–1 of switch S8, resistor R15, and contacts 1–3 of switch S2A to potentiometer R16A. From the wiper of potentiometer R16A, the signal is applied through contacts 2–4 of switch S8, contacts 7–9 of switch S2A, and resistor R21 to the grid of amplifier V2.

(*a*) Resistor R15 is used to calibrate meter M2 for indication on the OUTER scale. When switch S2 is operated to the DIRECT READING position, resistor R14 is used to calibrate meter M2 for indication on the OUTER scale; resistor R19 is used to calibrate meter M2 for indication on the INNER scale.

(*b*) Potentiometer R16A and resistor R17 provide a means of inserting the supplied azimuth information into the meter circuit. When switch S8 is operated to the INNER position, potentiometer R16B and resistor R20 perform the same function.

(*c*) Resistor R21 and capacitors C7 through C12 form a resistance-capacitance (RC) network, which dampens the meter circuit. Capacitors C7 through C12 may be inserted into the circuit as required (by the data supplied) by the manual operation of time constant selector switch S5 (MINUTES). The larger the capacitor, the greater the amount of dampening, and consequently the longer the time constant.

(2) *Output from amplifier V2.* The output signal of the amplifier increases or decreases as the input signal is applied to the grid: a negative input signal decreases the output, causing meter M2 to indicate to the left; a positive input signal increases the output, causing meter M2 to indicate to the right. The output signal is applied from the plate of amplifier V2 through resistor R27, potentiometer R28, contacts 10–12 of switch S2C, contacts 4–8 of switch S4, and contacts 3–7 of switch S9 to the positive terminal of meter M2. From the negative terminal of meter M2, the signal is applied through contacts 6–2 of switch S9, contacts 7–3 of switch S4, contacts 9–7 of switch S2C, contacts 8–4 of switch S7, and the 45-volt section of battery BT4 to ground.

(*a*) Resistors R25 and R27, potentiometers R26 and R28, and meter M2 are connected in series parallel with amplifier V2 to form a plate load network. Potentiometers R26 and R28 provide a means of adjusting the voltage drops across the parallel branches of the plate load network until the voltage drop across meter M2 causes the meter to indicate zero when no signal is applied to amplifier V2.

(*b*) Battery BT4 provides the B+ for amplifier V2.

(*c*) Battery BT3 provides the filament voltage for amplifier V2.

(3) *Bias circuit.* The bias for amplifier V2 is developed across resistor R23 and potentiometer R24. When switch S9 is operated to the down position, the bias circuit is connected through resistor R22 and contacts 11–7 of switch S9 to meter M2. Resistor R22 is used to calibrate meter M2 for use when adjusting the bias for amplifier V2.

(4) *Emergency circuit.* If a component (vacuum tube or battery) fails in the amplifier circuit, an emergency circuit is provided by operating switch S2 to the DIRECT READING position. The emergency circuit is from contacts 3–1 of switch S8 through resistor R14, contacts 2–3 of switch S2A, potentiometer R16A, contacts 2–4 of switch S8, contacts 11–12 of switch S2C, contacts 4–8 of switch S4, contacts 3–7 of switch S9 to meter M2.

Note. There is no dampening (RC) network in the emergency circuit. The meter indicator will vary in direct proportion to the input signal.

b. Test Voltage Circuit. The test voltage circuit is provided so that the meter may be adjusted for full-scale deflection. Full-scale deflection on the OUTER scale of meter M2 will occur when the wind speed is 50 miles per hour (mph) and from a direction 90° from the oriented position of the mast; a 25-mph wind from the same direction will cause full deflection on the INNER scale of meter M2. When switch S1 is operated to the FULL SCALE ADJUST position and switch S4 is held in the down position, a test voltage is applied from series-connected batteries BT6 and BT5 through contacts 1–5 of switch S1, potentiometer R29, contacts 3–7 of switch S1, resistor R18, contacts 12–8 of switch S4, and contacts 3–7 of switch S9 to the positive terminal of meter M2. From the negative terminal of meter M2, the circuit is completed through contacts 6–2 of switch S9 and contacts 7–11 of switch S4 to ground.

(1) Resistor R18 is used to calibrate meter M2 for the test voltage.

(2) Batteries BT5 and BT6 provide a substitute voltage for the input signal.

c. Panel Lighting Circuit. The panel lighting circuit is used to light the main panel of the indicator when taking meter readings or calibrating the indicator. When switch S10 is operated to the ON position, voltage is applied from series-connected batteries BT7 and BT8 through contacts 2–4 and 1–3 of switch S10 to parallel-connected lamps DS1 through DS7.

Section II. HYDRAULIC SYSTEM

57. General

The hydraulic system is used to extend and retract the seven-sectioned telescopic mast. Two pumps are provided in the hydraulic system: a dc motor-driven pump and an ac motor-driven pump. Either the ac or dc motor-driven pump may be used to extend and retract the mast. The electrical circuit that controls the ac motor is described in paragraph 58. The electrical circuit that controls the dc motor is described in paragraph 59. The ac and dc motor-driven pump systems are described in paragraph 60.

58. Ac Motor Electrical Circuit (fig. 25)

The ac motor operates on 110 volts ac, which may be supplied by the PE–75–AF or any commercial source of 110 volts ac. The 110-volt ac is applied through 110V A.C. circuit breaker S1 to the ac motor circuit and the 110-volt ac light circuit.

a. Ac Motor Circuit. The ac motor is controlled by PUMP 110V A.C. switch S2. When switch S2 is in the UP position, 110 volts ac is applied through contacts 7–3 and 8–4 to the ac motor. The ac motor operates, causing oil from the oil tank to be pumped into the mast (par. 60*a*). When switch S2 is in the DOWN position, 110 volts ac is applied through contacts 7–11 and 8–12 to the ac motor. This reverses the ac motor, causing the oil to be pumped from the mast into the oil tank (par. 60*d*).

Note. Any time the ac motor is to be reversed, switch S2 must first be operated to the OFF position and left in that position until the motor stops. If switch S2 is operated from one position (UP or DOWN) to the opposite position without waiting for the motor to stop, the motor will continue to run in the original direction.

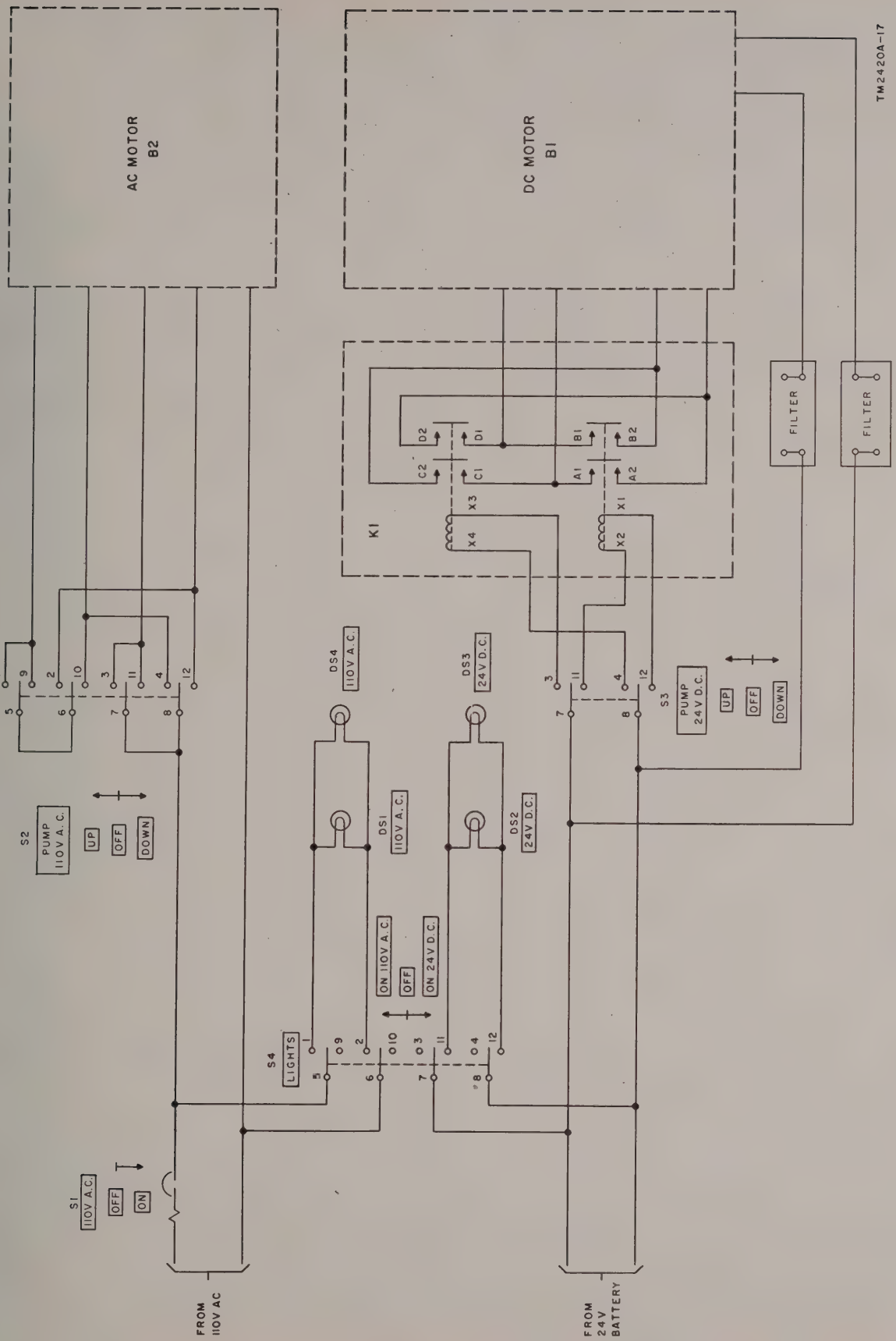


Figure 25. Trailer Mounted Mast AB-328A/G, schematic diagram.

b. Light Circuit, 110 Volts Ac. The light circuit is controlled by LIGHTS switch S4. When switch S4 is in the ON 110V A.C. position, 110 volts ac is applied through contacts 5–1 and 6–2 to parallel-connected lamps DS1 and DS4. The 110-volt ac lamps provide light at the base of the mast when ac is used for mast operation.

59. Dc Motor Electrical Circuit (fig. 25)

The dc motor operates on 24 volts dc, which is normally supplied by the 24-volt battery in the towing vehicle. The 24 volts dc is applied directly to the dc motor circuit and the 24-volt dc light circuit.

a. Dc Motor Circuit. Twenty-four volts dc is applied through two filters to the dc motor. The dc motor is controlled through relay K1 by PUMP 24V D.C. switch S3. When switch S3 is in the UP position, the 24 volts is applied through contacts 7–3 and 8–4 to winding X3–X4 of relay K1. The voltage applied to the X3–X4 winding closes contacts C1–C2 and D1–D2, operating the dc motor, which causes the oil from the oil tank to be pumped into the mast (par. 60*a*). When switch S3 is in the DOWN position, the 24 volts is applied through contacts 7–11 and 8–12 of switch S2 to winding X1–X2 of relay K1. The voltage applied to the X1–X2 winding closes contacts A1–A2 and B1–B2, reversing the dc motor, which causes the oil to be pumped from the mast into the oil tank (par. 60*d*).

Note. Any time the dc motor is to be reversed, switch S3 must first be operated to the OFF position and left in that position until the motor stops. If switch S3 is operated from one position (UP or DOWN) to the opposite position without waiting for the motor to stop, the motor may be damaged.

(1) The two filters, in series with each side of the 24-volt battery and the dc motor, are used to suppress radio-frequency radiation.

(2) Relay K1 is used to reverse the direction of the dc motor.

b. Light Circuit, 24 Volts Dc. The light circuit is controlled by LIGHTS switch S4. When switch S4 is in the ON 24V D.C. position, 24 volts dc is applied through contacts 7–11 and 8–12 to parallel-connected lamps DS2 and DS3. The lamps provide light at the base of the mast when dc is used for mast operation.

60. Ac and Dc Motor-Driven Pump Systems (fig. 25)

Both the ac and dc motor-driven pump systems are functionally the same. Only the dc motor-driven pump circuit will be discussed in detail. The dc motor drives the pump, which pumps oil into and out of the mast.

a. Extending Mast. When the oil tank vent valve (green), oil control valve (yellow), and oil shutoff valve (blue) are opened and the PUMP 24V D.C. switch (not shown) is in the UP position, oil is pumped from the oil tank through the dc motor-driven pump, oil control valve (yellow), and oil shutoff valve (blue) into the mast. As the oil pressure increases, the mast sections are forced upward. When the mast is fully extended, the oil pressure will continue to increase to 60 pounds per square inch (psi) ; at 60 psi, the pressure relief valve opens. The pressure relief valve maintains the oil pressure in the mast at 60 psi by permitting the excess oil to return to the top of the oil tank.

b. Mast Pressure Relief Valve. When the mast is fully extended, the oil shutoff valve (blue) is closed so that 60 psi of oil pressure will remain in the mast when the dc motor is stopped. To protect the mast assembly from damage from excessive oil pressure caused by solar heat, the mast pressure relief valve automatically opens to maintain the oil pressure at 60 psi. The mast pressure relief valve permits the excess oil from the mast to be returned through the mast pressure relief valve, oil control valve (yellow), and pump to the tank.

c. Restoring Mast to Full Extension. If the surrounding temperature decreases after the mast has been fully extended, the oil pressure will decrease, permitting the mast to partially retract. The oil shutoff valve (blue) must be opened and the PUMP 24V D. C. switch operated to the UP position to restore the oil pressure in the mast. When the mast is fully extended, the oil shutoff valve (blue) should be closed and the PUMP 24V D.C. switch operated to the OFF position.

d. Retracting Mast. When the oil shutoff valve (blue) is opened and the PUMP 24V D.C. switch

is operated to the DOWN position, oil is pumped from the mast through the oil shutoff valve (blue), oil control valve (yellow), and the pump into the oil tank. The weight of the mast sections and removal of oil pressures causes the mast to return to its nested position.

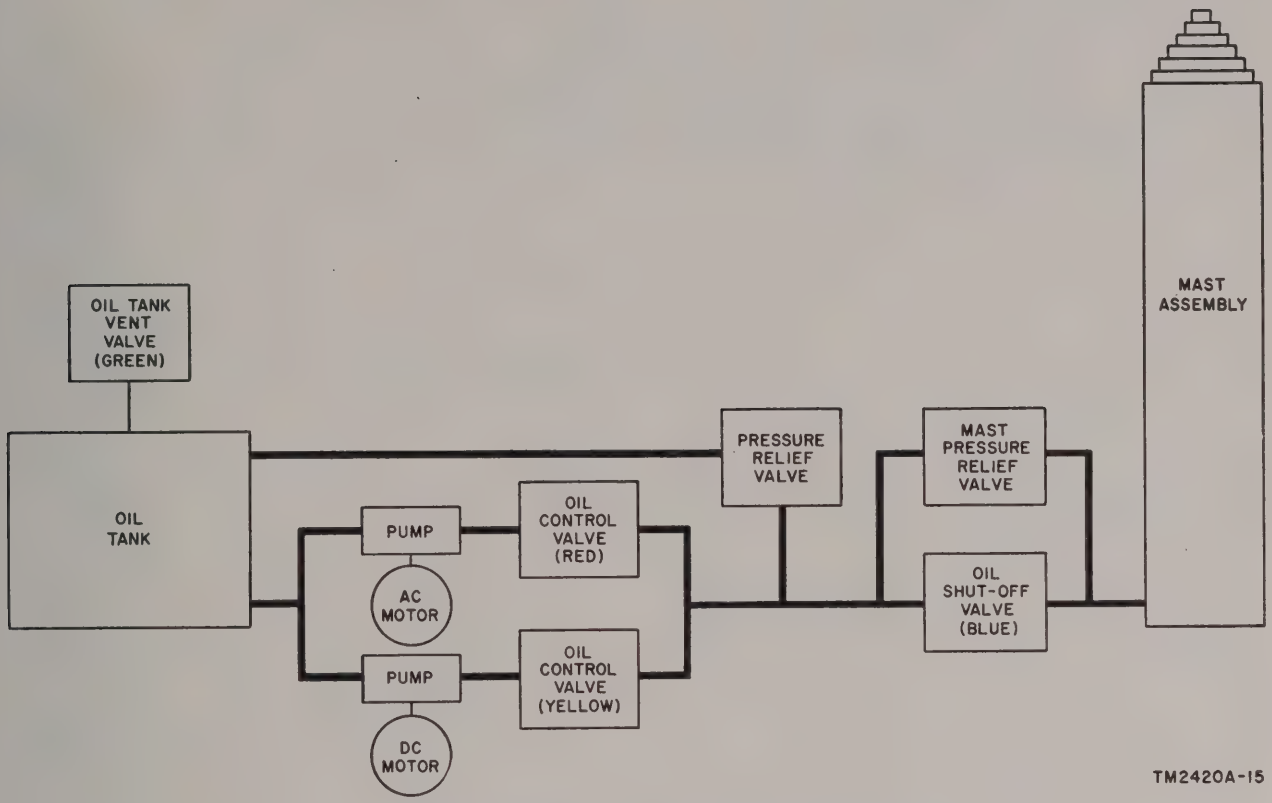


Figure 26. Hydraulic system, block diagram.

CHAPTER 6

FIELD MAINTENANCE

Note. This chapter contains information pertinent to field maintenance. The amount of repair that can be performed by units having field maintenance responsibility is limited only by the tools and test equipment available and the skill of the repairman.

Section I. INTRODUCTION

61. General

Troubleshooting at field maintenance level includes all techniques outlined for organizational maintenance (pars. 37–52) and all other techniques that may be required to locate, repair, adjust, and replace a defective part. The field maintenance instructions provide complete instructions for the removal and replacement of defective parts not described in organizational maintenance. Complete procedures are given in the final testing section for testing a repaired equipment to determine its efficiency.

62. Tools, Materials, and Test Equipment

a. Tools and Materials. The tools and materials required by the field maintenance personnel are the same as required by the organizational maintenance personnel (par. 43).

b. Test Equipment.

Quantity (ea)	Test equipment
2	Multimeters TS–532/U (TM 11–5527)
1	Variac, such as, General Radio Company, type 200–CM.
1	Electronic Multimeter TS–505/U (TM 11–5511).
1	Oil pressure gage, 0–150 lb
1	Motor, ac, 1800 rpm (Sig C stock No. 4TMU4)
1	Variable resistor (Sig C stock No. 6RP6905)
1	Push-button switch (Sig C stock No. 6Z9558–39.11).
3	Batteries BA–44

Section II. PREREPAIR PROCEDURES

63. Cleaning and Inspecting

Clean and check the AN/MMG–1A as explained below to determine the extent of repair necessary to prepare the equipment for reissue. Tag each item that requires repair at the time the defect is found.

a. Wind Speed Transmitter.

(1) Use a clean lint-free cloth and remove all dust, dirt, and grease from the wind speed transmitter.

(2) Clamp the vertical shaft of the wind speed transmitter in a vise so the unit can be rotated on the vertical shaft. Check to see that it rotates freely.

(3) Spin the impeller, and make sure it rotates freely.

(4) Check to be sure that the tail vane is not dented or bent.

(5) Check the equipment for tags, markings, or other indications of trouble.

b. Indicator.

(1) Use a clean lint-free cloth and remove all dust, dirt, corrosion, and grease from the indicator.

(2) Check the meters to be sure they are not broken.

(3) Operate all switches and controls to be sure that each operates easily and has a positive action.

(4) Check each bindnig post to be sure it will properly clamp a field wire conductor.

(5) Check the case for tags or other markings that may indicate the cause of the trouble.

c. Mast and Hydraulic System.

(1) Remove all dust, dirt, grease, and corrosion from the mast, hoses, valves, pumps, and motors mounted in the trailer. Use a lint-free cloth to clean the components.

(2) Check each valve and hose for oil leaks.

(3) Check the ac and dc motors and pumps for damage.

(4) Check the mast base and hinge to be sure they are not bent or broken.

(5) Check each mast section for dents or other damage.

(6) Check the adapter at the top of the mast to be sure it has not been damaged. Be sure the threads have not been damaged.

(7) Check the PE–75–AF as explained in TM 11–900A.

(8) Check the trailer as explained in TM 9–874A.

64. Troubleshooting Chart

a. Indicator.

Symptom	Probable trouble	Corrective measure
1. Meter M1 (ELEVATION (MILS)) cannot be adjusted to zero.	*a.* Defective switch (S1–S7).	*a.* Replace switch.
	b. Defective meter M1.	*b.* Replace meter.
	c. Sine-cosine potentiometer in the wind speed transmitter improperly alined.	*c.* Aline or replace sine-cosine potentiometer (par. 78).
	d. Defective potentiometer R3, R9, R11, or R13.	*d.* Replace potentiometer.
2. Meter M2 (AZIMUTH (MILS)) cannot be adjusted to zero.	*a.* Defective switch S1, S2, S4, S5, S7, S8, or S9.	*a.* Replace switch.
	b. Defective meter M2.	*b.* Replace meter.
	c. Sine-cosine potentiometer in wind speed transmitter improperly alined.	*c.* Aline or replace sine-cosine potentiometer (par. 78).
	d. Defective potentiometer R16, R24, R26, or R28.	*d.* Replace potentiometer.
3. All panel lights fail to light.	Defective switch S10.	Replace switch.
4. Single panel light fails to light.	Defective lamp socket or wiring.	Replace lamp socket or repair wiring.
5. Meter M1 (ELEVATION (MILS)) cannot be adjusted to full-scale reading.	*a.* Defective switch S1.	*a.* Replace switch
	b. Defective potentiometer R13.	*b.* Replace potentiometer.
	c. Defective resistor R12.	*c.* Replace resistor.
6. Meter M2 (AZIMUTH (MILS)) cannot be adjusted to full-scale reading.	*a.* Defective switch S1.	*a.* Replace switch.
	b. Defective potentiometer R28.	*b.* Replace potentiometer.
	c. Defective resistor R27.	*c.* Replace resistor.
7. Bias for tube V1 cannot be adjusted.	*a.* Defective resistor R7 or R8.	*a.* Replace resistor.
	b. Defective potentiometer R9.	*b.* Replace potentiometer.
	c. Defective switch S6.	*c.* Replace switch.
8. Bias for tube V2 cannot be adjusted.	*a.* Defective resistor R22 or R23.	*a.* Replace resistor.
	b. Defective potentiometer R24.	*b.* Replace potentiometer.
	c. Defective switch S9.	*c.* Replace switch S9.
9. Meter M1 indicates permanent off-scale deflection.	*a.* Defective switch S5.	*a.* Replace switch.
	b. Defective capacitor (C1 through C6).	*b.* Replace capacitor.
10. Meter M2 indicates permanent off-scale deflection.	*a.* Defective switch S5.	*a.* Replace switch.
	b. Defective capacitor (C7 through C12).	*b.* Replace capacitor.
11. Meter M1 or M2 does not indicate.	*a.* Defective generator in wind speed transmitter.	*a.* Replace generator (pars. 69–72).
	b. Defective generator wiring.	*b.* Replace generator.

b. Hydraulic System.

Symptom	Probable trouble	Corrective measure
1. Mast fails to extend with ac driven pump.	Defective ac driven pump.	Replace pump (par. 82).
2. Mast fails to extend with dc driven pump.	Defective dc driven pump.	Replace pump (par. 82).
3. Mast cannot be turned in azimuth when in upright position.	Mast base damaged.	Replace mast base (par. 49).
4. Ac motor fails to run.	Defective ac motor.	Replace ac motor (par. 80).
5. Dc motor fails to run.	Defective dc motor.	Replace dc motor (par. 81).
6. Mast fails to remain in extended position with pump turned off.	*a.* Defective gate valve (blue).	*a.* Replace defective gate valve (par. 52*a*).
	b. Defective mast pressure relief valve.	*b.* Replace defective mast pressure relief valve (par. 83).
7. Mast cannot be fully extended.	*a.* Insufficient oil in tank.	*a.* Add oil to tank.
	b. Bent or damaged mast section.	*b.* Replace damaged section (par. 49).

c. Wind Speed Transmitter.

Symptom	Probable trouble	Corrective measure
1. Impeller does not rotate properly.	Defective generator armature bearings.	Replace generator armature bearings (pars. 69–72).
2. Wind speed transmitter does not rotate in azimuth.	Defective vertical support bearings.	Replace vertical support bearings (pars. 69–72).

Section III. REPLACEMENT OF PARTS, AZIMUTH AND ELEVATION CORRECTION DATA INDICATOR ID–415A/MMQ–1

Note. When replacing defective parts, reassembly procedure, unless otherwise specified, is accomplished by reversing the disassembly procedure.

65. Potentiometer R3 or R16
(figs. 3 and 28)

a. Remove the control knobs and screws from the raised panel and carefully lift the raised panel from the indicator.

b. Rotate the potentiometer to its extreme counterclockwise position.

Caution: Do not attempt to rotate the potentiometer beyond its mechanical stop.

c. Mark the exact position of the 888 dial indication on the main panel.

d. Loosen the setscrews that secure the dial to the potentiometer and remove the dial.

e. Loosen the thumbscrews and open the main panel.

f. Tag and unsolder the wires from the potentiometer.

g. Remove the defective potentiometer and replace it with a new one.

h. Rotate the new potentiometer to its extreme counterclockwise position.

i. Position the dial on the new potentiometer so that the 200 dial indication is alined with the mark ((3) above) on the main panel. Tighten the setscrews to secure the dial on the potentiometer.

66. Switch S5
(figs. 3 and 28)

a. Loosen the thumbscrews and open the main panel and tag and unsolder the wires from the switch.

b. Rotate the switch to its extreme counterclockwise position.

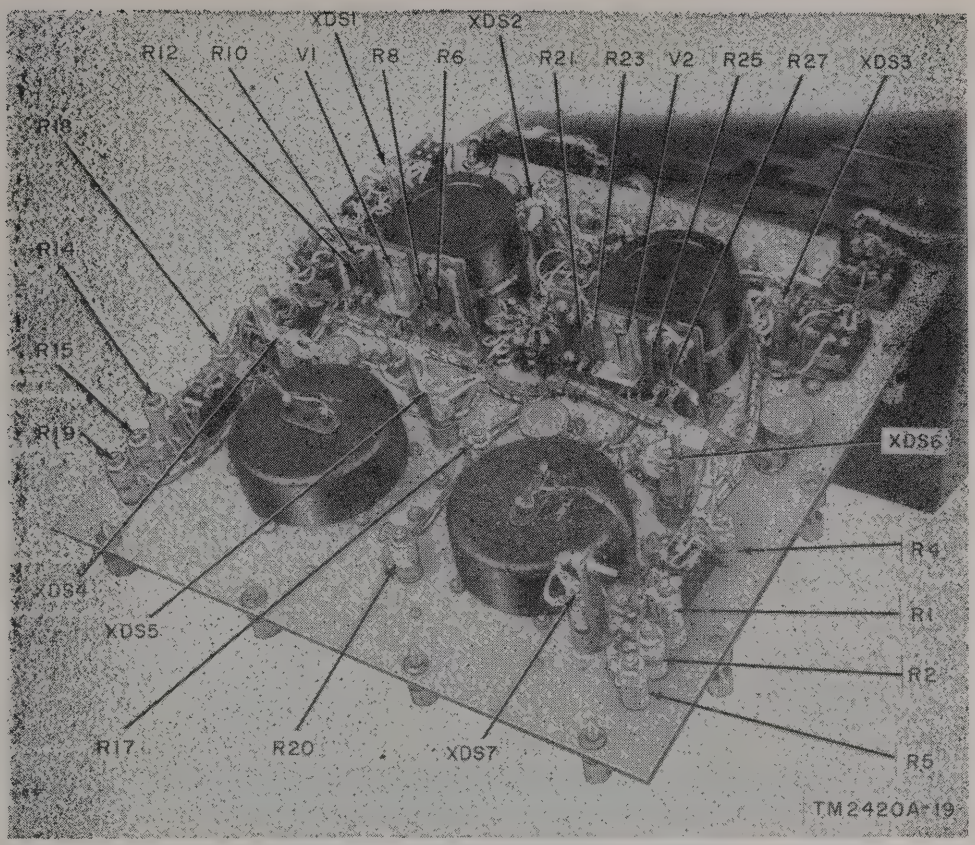


Figure 27. Indicator resistors, potentiometer, and lamp socket, parts location diagram.

c. Mark the exact position of the 5 settings on the main panel.

d. Loosen the setscrew that secures the dial to the switch and remove the dial.

e. Loosen the thumbscrews and open the main panel.

f. Tag and unsolder the leads from the switch.

g. Remove the defective switch from the main panel and replace it with a new one.

h. Rotate the new switch to its extreme counterclockwise position.

i. Position the dial on the new switch so that the 5 setting is alined with the mark ((3) above) on the main panel. Tighten the setscrew to secure the dial to the switch.

67. Capacitors C1 through C12
(figs. 3 and 28)

Capacitors C1 through C12 are mounted in four rows and each row of three capacitors is secured by two retaining screws.

a. Loosen the thumbscrews and open the main panel.

b. Tag and unsolder the wires from the defective capacitor.

c. Remove the retaining screws and carefully remove the defective capacitor. Replace it with a new one. Do not disturb the other two capacitors.

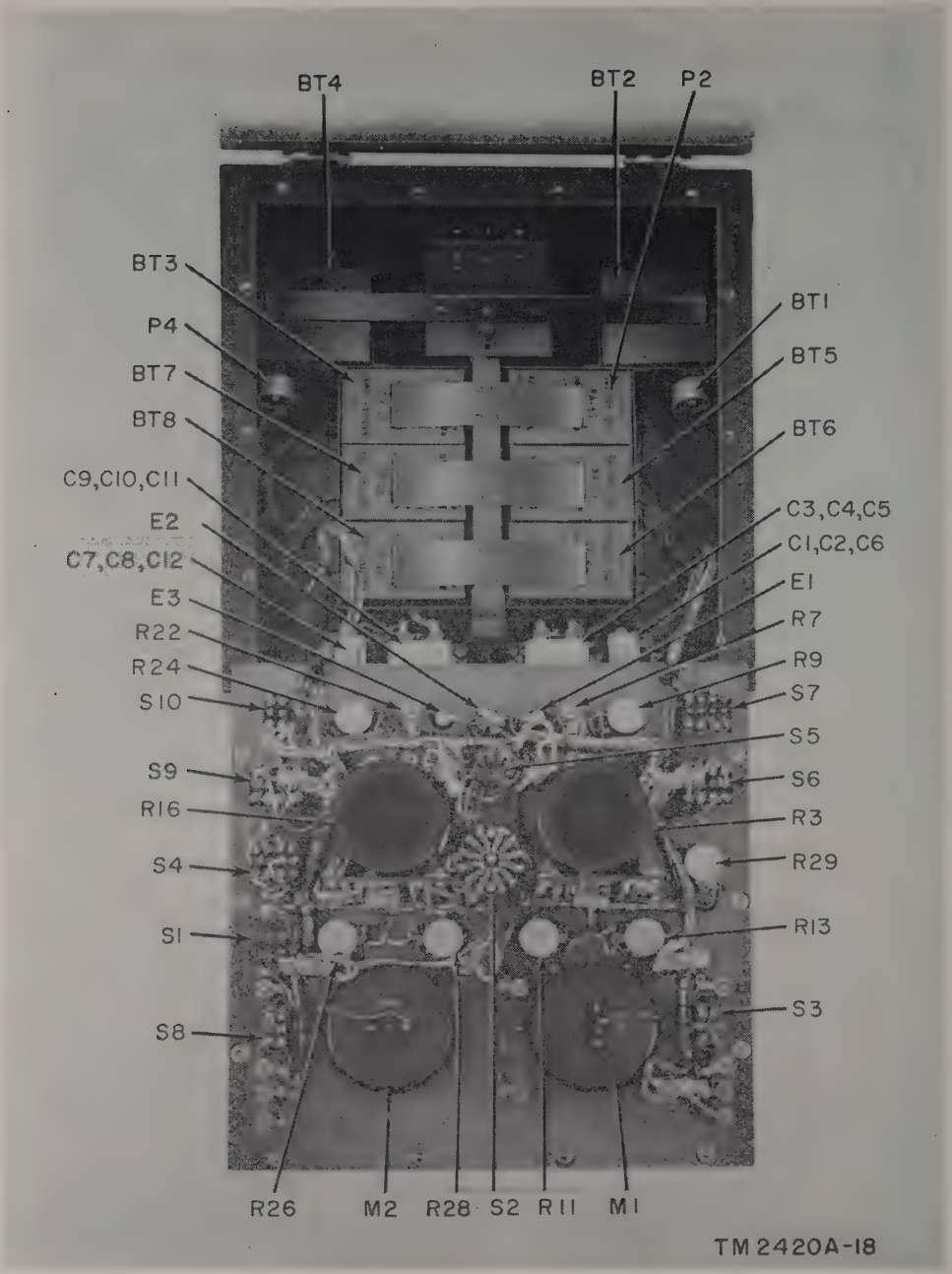


Figure 28. Indicator resistors, capacitors, switches, meters and batteries, parts location diagram.

Section IV. REPLACEMENT OF PARTS, WIND SPEED TRANSMITTER T–610/MMQ–1A

Caution: Do not disassemble the dc generator unless the required tools and jigs (par. 68) are available for use. Follow the instructions carefully when repairing the generator or it may be permanently damaged.

68. Tools and Jigs Required

The following tools and jigs are required to disassemble and repair the dc generator. Fabricate the tools and jigs as described in *a* through *d* below and figures 29 through 32.

a. Magnet Keeper (fig. 29).

(1) Turn the magnet keeper from a piece of machine steel.

(2) Figure 29 illustrates the completed magnet keeper and gives the dimensions. Be sure the dimensions are accurate because they are critical.

(3) Check the magnet keeper to be sure that all burs and filings have been removed.

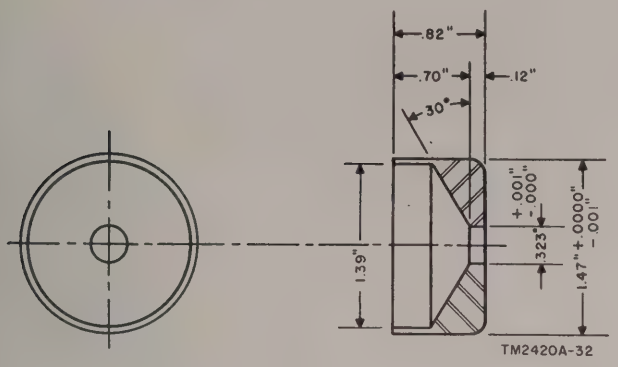


Figure 29. Magnet keeper.

b. Burnisher (fig. 30).

(1) Cut the burnisher from a piece of tool steel.

(2) Bend the burnisher to the shape illustrated in figure 30 and shape the tip on the burnisher with an emery wheel. Be sure to remove all of the burs and metal filings.

(3) Temper the end of the burnisher so that it is very hard, and polish it with a buffing wheel.

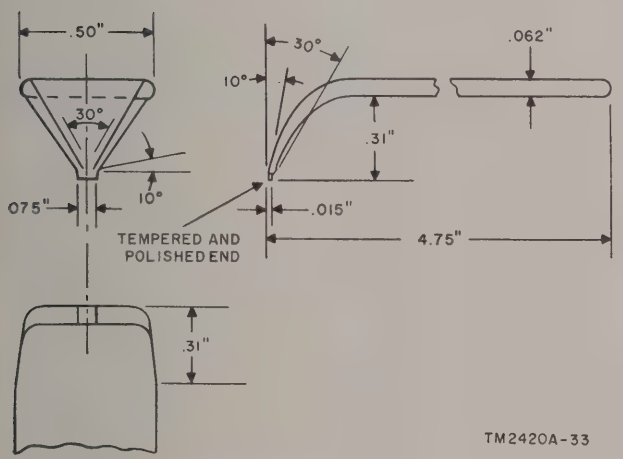


Figure 30. Burnisher.

c. Yoke (fig. 31).

(1) Cut a $3\frac{6}{64}$-inch piece of cold rolled steel from a length of $1\frac{3}{4}$-inch stock.

(2) Turn the stock to a diameter of $1\frac{15}{32}$-inch on a metal lathe.

(3) Cut the steel disk to a thickness of $2\frac{9}{64}$-inch on a milling machine.

(4) Shape the disk as illustrated in figure 31 with a milling machine.

(5) Be sure to remove all burs and filings from the yoke.

(6) Cadmium plate the completed yoke.

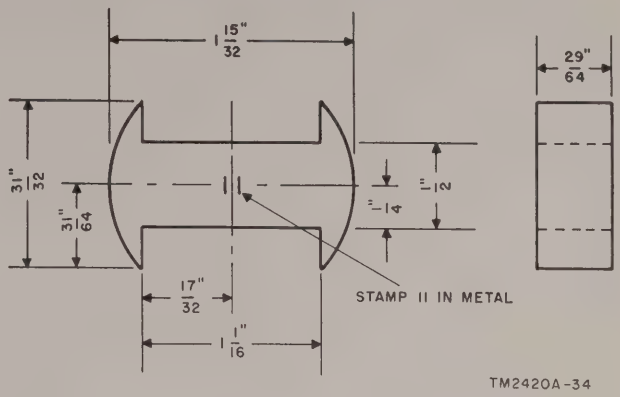


Figure 31. Yoke.

d. Demagnetizer (fig. 32).

(1) Cut several laminations from a sheet of 0.025-inch silicon sheet steel.

(2) Clamp the laminations together and drill the rivet holes.

(3) Rivet the laminations together with seven steel rivets.

(4) Remove all burs from the coil mounting with an emery wheel.

(5) Place a coil consisting of 390 turns of No. 16 B&S wire gage on each pole piece. Be sure the windings are wound in the proper direction.

69. Disassembly of Dc Generator

a. Remove the dc generator from the wind speed transmitter (par. 48*d*(1)–(7)).

b. Remove the commutator brushes from the dc generator (par. 48*d*(8)).

c. Unscrew the four flathead machine screws (12, fig. 33) and remove the end plate (13) and gasket (14) from the retainer (11).

d. Remove the machine screws (9) and lockwashers (10), and lift the retainer (11) from the end of the dc generator.

e. Bend the flange of the retainer (16) clear of the grooves in the round nut (15) with a sharp tool.

f. Unscrew the round nut (15) from the armature shaft (36). Hold the armature so that it

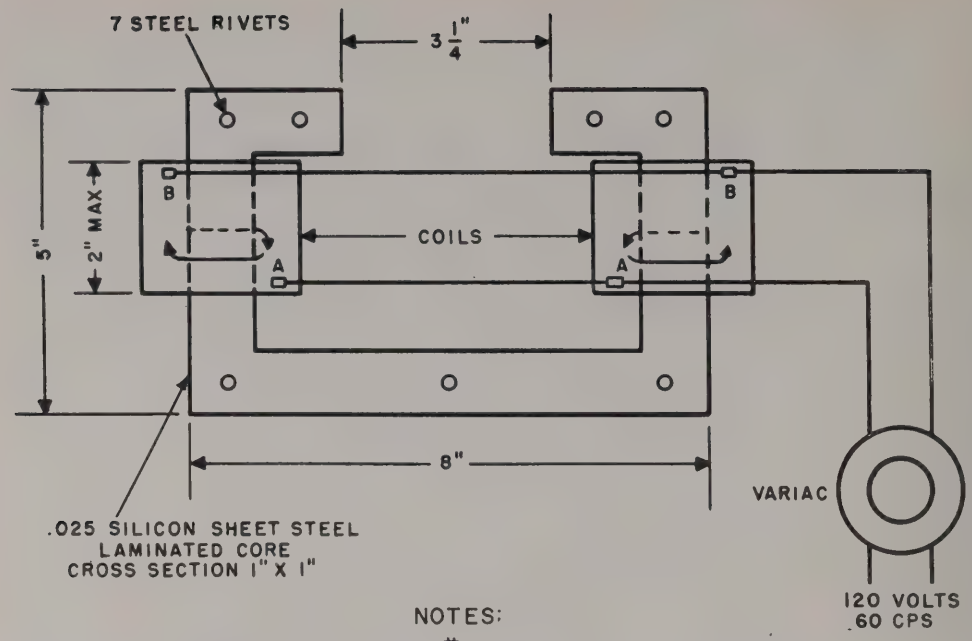


Figure 32. Demagnetizer.

does not turn while unscrewing the round nut. Slide the retainer (16) and the ball bearing (29) out of the base (24).

g. File a mark on the flanges of the base (24) and the housing assembly (35) so they can be properly aligned when the generator is assembled.

h. Cut the sealing wire (17) and remove the machine screws (18 and 21), lockwashers (19 and 22), and flat washers (20 and 23).

i. Tap the end of the armature shaft (36) with a rawhide hammer to loosen the base (24). Slide the base (24) off the end of the armature shaft (36).

Caution: Do not pull the armature out of the magnet at this time or the magnetic circuit of the magnet will be opened and its magnetic field will instantly drop below calibrating range.

j. The three generator shunt retainers (25), three retainer springs (26), magnetic shunt pinion (27), and pinion spring (28) will drop out of the base (24) when the base is removed from the dc generator.

k. Remove the sealing screw (30) and the internal screw (31) from the base (24).

l. Mark the position of the magnetic shunt (32) on the shunt and the housing assembly (35) with a scribe or file. Remove the magnetic shunt (32), shunt spacer (33), and gasket (34) from the base (24).

m. Remove the two magnet screws (38).

n. Slide the armature (36) and the magnet (39) out of the housing assembly (35).

Caution: Remove the magnet and the armature from the housing as a unit to prevent opening the magnetic circuit of the magnet.

o. Disassemble the output terminal assembly (40) if repairs are necessary.

p. Remove the magnet (39) from the armature (36) as follows:

(1) Slide the magnet keeper (par. 68*a*) on the armature shaft from the commutator end so that the concave side of the magnet keeper fits over the armature and the flange of the magnet keeper slides between the armature and the magnet.

(2) Slide the magnet (39) and the keeper off the armature (36).

Caution: Do not remove the magnet keeper from the center of the magnet unless it is necessary to remagnetize the magnet.

q. Disassemble the components from the commutator end of the armature (36) as follows:

(1) Remove the hexagonal nut (36A) and the lockwasher (36B) from the end of the shaft.

(2) Force the ball bearing (36C) off the end of the shaft. Tap the ball bearing (36C) lightly with a rawhide hammer if necessary.

(3) Remove the oil slinger (36D), pin (36F), bushing (36E), and spring washer (36G) from the shaft of the armature (36).

r. The ball bearings of the generator (29 and 36*c*, fig. 33) must be replaced each time the dc generator is disassembled. Do not risk using the old ball bearings. Install new ball bearings as follows:

(1) Remove the grease coating from the new bearings by thoroughly washing them in Cleaning Compound.

(2) Dry the bearings thoroughly and immediately coat the balls with a very light protective coating of grease (GL). Do not overlubricate. Use the old bearing as a guide (if this is a first-time repair) for the quantity of grease required. Any quantity of grease greater than that required for weather protection (a thin surface film) is considered overlubrication.

70. Inspecting and Cleaning Dc Generator Components

(fig. 33)

a. Inspect the dc generator component bearing surfaces (fig. 33) to be sure they are not worn or scored. Replace all components that have damaged bearing surfaces.

b. Inspect the commutator to be sure it is not pitted or worn. If the commutator is pitted or worn, resurface it on a small lathe. Be sure to remove all filings and burrs from the edges of the commutator segments. Burnish the edges of the commutator segments by running the burnisher (fig. 30) in the grooves between the segments. Run the burnisher parallel to the armature shaft.

c. Check to be sure that the commutator brushes are not worn or damaged. Replace the brush assembly (8) if the brushes are worn or damaged (par. 48*d*).

d. Check all gaskets (4, 14, and 34) to be sure they were not damaged when the generator was disassembled. Replace all damaged gaskets.

e. Clean the base (24) and housing assembly (35). Be sure that all grease, dust, and dirt are wiped from the base and housing assembly. Check the base and housing assembly for cracks.

f. Check the retainer spring (26) and the pinion spring (28) for proper tension. Replace the springs if they are weak or damaged.

g. Check the winding of the armature (36) to be sure it has not been damaged.

71. Remagnetizing Magnet

The procedure in *a* through *e* below must be followed if the dc generator output was too low or if the armature or the magnet keeper was momentarily removed from the center of the magnet (magnetic circuit opened).

a. Wrap 4 turns of No. 6 AWG double cotton-covered flexible copper wire around the center section of the yoke (fig. 34).

b. Place the yoke in the center of the magnet so that the winding is in the direction shown in figure 34.

c. Lay the magnet and the yoke on the bench so that the counterbored holes are visible. Mark an X on the magnet at the same relative location as shown on figure 34.

Note. The X marked on the magnet is used to properly position the magnet in the dc generator (par. 73).

d. Connect the winding, a 6-volt battery, and a heavy duty knife switch in series. Be sure that the battery is poled to supply the voltage as shown in figure 34.

e. Momentarily close the knife switch. The magnet is now remagnetized and may be installed in the dc generator.

Caution: Do not remove the yoke from the magnet at this time.

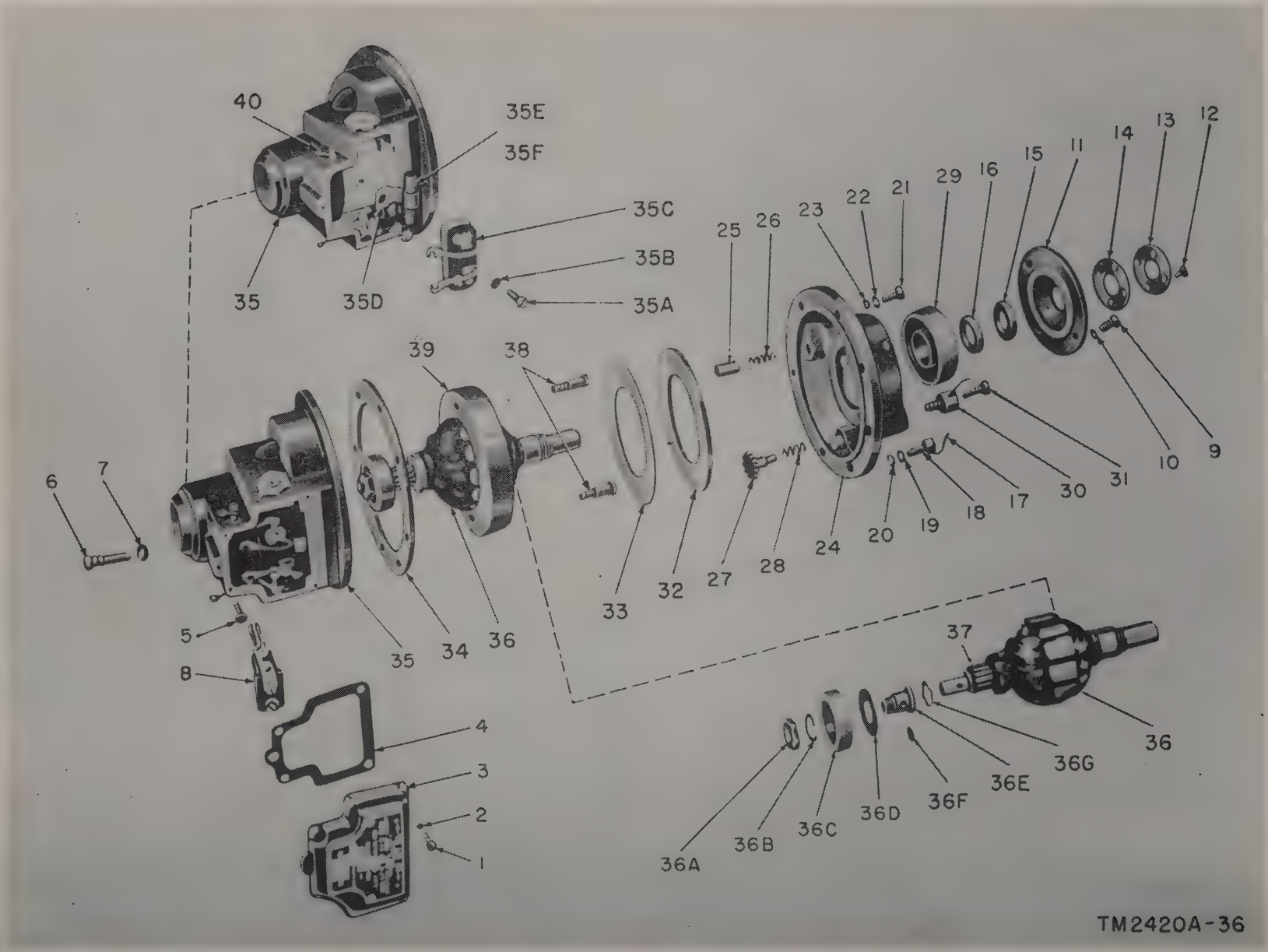


Figure 33. Dc generator, exploded view.

1 Roundhead screw
2 Lockwasher
3 Cover
4 Gasket
5 Retainer pin
6 Screw pin
7 Insulating washer
8 Commutator brush assembly
9 Machine screw
10 Lockwasher
11 Retainer
12 Flathead machine screw
13 End plate
14 Gasket
15 Round nut
16 Retainer
17 Sealing wire
18 Machine screw
19 Lockwasher
20 Flat washer
21 Machine screw
22 Lockwasher
23 Flat washer
24 Base
25 Generator shunt retainer
26 Retainer spring
27 Magnetic shunt pinion
28 Pinion spring
29 Ball bearing
30 Sealing screw
31 Internal screw
32 Magnetic shunt
33 Shunt spacer
34 Gasket
35 Housing assembly
A—Machine screw
B—Lockwasher
C—Resistance spool
D—Neutralizer bracket
E—Neutralizer
F—Insulator
36 Armature
A—Hexagonal nut
B—Lockwasher
C—Ball bearing
D—Oil slinger
E—Bushing
F—Pin
G—Spring washer
37 Commutator
38 Magnet screws
39 Magnet
40 Output terminal assembly

Figure 33—Continued.

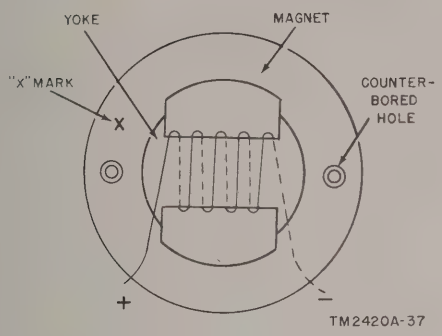


Figure 34. Magnet energizer.

72. Assembling Armature and Magnet

When replacing the ring magnet on the armature, follow the procedure in *a* through *d* below before assembling the dc generator.

a. Place the concave side of the magnet keeper (fig. 29) against the yoke on the side of the magnet opposite the mark.

b. Push the yoke out of the magnet with the magnet keeper. Be very careful so that the magnet keeper does not slide all the way through the magnet. If the magnet keeper is not kept in the magnet, the magnet must be remagnetized.

c. Position the magnet and magnet keeper on the commutator end of the armature shaft so that the concave side of the magnet keeper is nearest the armature.

d. Slide the magnet off the magnet keeper onto the armature. Be sure that the magnetic circuit is not broken while moving the magnet.

73. Assembling Dc Generator (fig. 33)

a. Slide the spring washer (36G) and bushing (36E) onto the commutator end of the armature shaft.

b. Replace the pin (36F) in the bushing (36E) and the armature shaft.

c. Slide the oil slinger (36D) and the ball bearing (36C) on the bushing (36E). Tap the bearing with a rawhide hammer if necessary.

d. Replace the lockwasher (36B) and the hexagonal nut (36A) on the armature shaft. Tighten the hexagonal nut securely.

e. Slide the commutator end of the armature shaft into the housing assembly (35). Be sure that the magnet (39) remains on the armature (36).

f. Position the housing assembly (35) on the bench so that it rests on the flatted portion of the flange and the brush opening is upward. Insert the armature (36) and the magnet (39) as a unit into the housing assembly (35). Position the magnet so that the counterbored holes in the magnet (39) are alined with the tapped holes in the housing assembly (35) and the mark (par. 71*c*) on the magnet (39) is on the lefthand side of the housing assembly (35). Seat the magnet (39) firmly in the housing assembly (35) and replace the magnet screws (38).

Caution: Be sure that the magnet is properly positioned in the dc generator housing or the

output from the generator will not be poled correctly.

g. Position the gasket (34) on the housing assembly (35).

h. Position the shunt spacer (33) and the magnetic shunt (32) against the magnet in the housing assembly (35). Be sure the magnetic shunt is placed in the same relative position as it was before the generator was disassembled, so that the teeth on the magnetic shunt pinion (27) will mesh.

i. Insert the three retainer springs (26) and the three generator shunt retainers (25) into the proper receptacles in the base (24).

j. Insert the pinion spring (28) and the magnetic shunt pinion (27) into the receptacle in the base (24).

k. Aline the marks (par. 69*l*) on the base (24) and the housing assembly (35) and slide the base (24) over the armature (36) and magnet (39) to the housing assembly (35). Check to be sure that the teeth on the magnetic shunt pinion (27) mesh with the teeth on the magnetic shunt (32).

l. Slide the lockwashers (19 and 22) and flat washers (20 and 23) on the machine screws (18 and 21). Screw the machine screws (18 and 21) into the tapped holes in the housing assembly (35). Tighten the machine screws.

m. Thread the sealing wire (soft iron wire) (17) through the holes in the machine screws (18 and 21) and twist the ends of the wire together.

n. Slide the ball bearing (29) and the retainer (16) onto the armature shaft. Be sure that the ball bearing is properly seated in the base (24).

o. Replace the round nut (15) and bend the retainer flange into the grooves in the round nut.

p. Replace the retainer (11) and secure it in position with machine screws (9) and lockwashers (10).

q. Replace the gasket (14) and end plate (13) and secure them in position with the flathead machine screws (12).

Note. Do not replace the sealing screw (30) or the internal screw (31) at this time.

r. Reassemble the output terminal assembly (40) if it was disassembled.

s. Replace the commutator brushes in the dc generator (par. 48*d*).

74. Adjusting and Testing Dc Generator

Proceed as follows to adjust and test the dc generator after reassembly:

a. Testing Generator Resistance. The total resistance of the generator (across the output terminals) must be 200 ±1 ohm. This total resistance is composed of the armature (36, fig. 33), the resistance spool (35C), and the neutralizer (35E) in series. The resistance spool is used to adjust the total resistance of the generator to 200 ±1 ohm (table, *b* below).

b. Adjusting Generator Resistance. The resistance values of the generator must be in accordance with the table below. If the original resistance spool is not open-circuited, short-circuited, or damaged, it may be used provided the spool contains sufficient resistance. If a new spool is installed, adjust the total magneto resistance by removing wire from the spool until the resistance is in accordance with the table below.

Table of permissible resistance

Generator Weston model No.	Component tested	Measured across	Permissible dc resistance (ohms)
750, type A14R	Armature	Brushes from term. 3 and 4	24 to 33
724, type A12R	Armature	Brushes from term. 3 and 4	10.5 to 14.2
750, type A14R	Commutator segments	Adjacent segments	8 to 11
724, type A12R	Commutator segments	Adjacent segments	3.5 to 4.5
750, type A14R	Neutralizer	Term. 2 and 5	95 to 110
724, type A12R	Neutralizer	Term. 2 and 5	95 to 110
750, type A14R	Resistance spool	Term. 3 and 4	Approx 70
724, type A12R	Resistance spool	Term. 3 and 4	Approx 85
750, type A14R	Overall generator	Output term.	200 ±1
724, type A12R	Overall generator	Output term.	200 ±1

c. Electrical Adjustments (fig. 35). To make proper electrical adjustments to the generator (G), the following equipment is necessary: one variable resistance (Ra) (Sig C stock No. 6RP6905); Multimeter TS–352/U; Electronic Multimeter TS–505/U; one synchronous motor (SYN MOTOR) (Sig C stock No. 4TMU4); one pushbutton switch (Sa) (Sig C stock No. 3Z9558–39.11); and three dry cell batteries (BA–44). Proceed as follows to make adjustments:

(1) Mechanically couple the generator (G) to the 1,800-rpm synchronous motor (SYN MOTOR).

(2) Connect the generator (G), the TS–352/U and TS–505/U, the variable resistor (Ra), the three Batteries BA–44, and the switch (Sa) as shown in figure 35. Observe the polarities. (The polarity of the terminals of the generator (G) is indicated on the nameplate.) Leave the plus or minus lead to the batteries disconnected.

Note. Wire the switch (Sa) so that it is push to open (normally closed).

(3) Using a screwdriver, set the magnetic shunt pinion (27, fig. 33) of the generator (G, fig. 35) to its middle position (1 turn from clockwise or counterclockwise position).

(4) Connect the batteries into the circuit.

(5) Adjust the variable resistor (Ra) until 10.8-volts are indicated on the TS–352/U.

(6) Connect the synchronous motor to the power source. Drive the generator (G) at 1,800 rpm.

(7) Push the switch (Sa).

(8) Readjust the variable resistor (Ra) until the TS–505/U indicates zero (center scale).

(9) Check the indication on the TS–352/U.

Note. The final adjusted open circuit voltage of the generator (G) is 6-volts per 1,000-rpm. At 1,800-rpm, this output must be 10.8-volts. The TS–352/U reads the open circuit voltage of the generator (G) when the TS–505/U reads zero, since no current is flowing in the external circuit. If the output is higher than 10.8-volts, the generator must be partially demagnetized by the proximity of a concentrated ac field as described in *d* below. If the output is less than 10.8-volts, the generator magnet was not sufficiently magnetized (par. 71).

d. Decreasing Magnetism of Generator.

(1) Straddle the generator with the poles of the demagnetizer coils (fig. 32) so that the lines of force cut the vertical axis of the generator magnet, which is located just inside the case.

(2) Gradually increase the ac voltage applied to the demagnetizer coil; keep the TS–505/U (fig. 35) on zero by adjusting the variable resistor (Ra) while watching the indication on the TS–352/U decrease.

(3) Continue to increase the ac voltage until the TS–352/U indicates 10.8-volts while the TS–505/U remains on zero.

e. Final Output Adjustment. Final output adjustment is made by rotating the magnetic shunt pinion (27, fig. 33) with a screwdriver.

(1) To increase the output, turn the magnetic shunt pinion (27) clockwise, and to decrease the output, turn the pinion counterclockwise.

(2) Drive the generator (G, fig. 35) at 1,800-rpm in the opposite direction.

(3) Rebalance the TS–505/U by adjusting the variable resistor, (Ra) and note the reading of the TS–352/U.

(4) Equalize the voltage output error (difference from 10.8-volts) between clockwise and counterclockwise armature rotation by setting the magnetic shunt pinion (27, fig. 33).

f. Locking Adjustment (fig. 33).

(1) Thread the sealing screw (30) into the base (24) and back off one-fourth turn.

(2) Thread the internal screw (31) into the

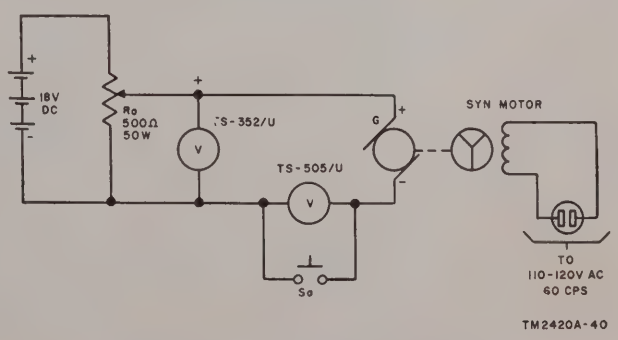


Figure 35. Dc generator test setup.

sealing screw (30) and tighten it against the end of the pinion.

(3) Firmly tighten the sealing screw (30) and the magnetic shunt will be locked in position.

(4) Replace the sealing wire.

Section V. REPLACEMENT OF SINE-COSINE POTENTIOMETER

75. Determining Alinement Point

a. Remove the vertical support from the wind speed transmitter (par. 48*c*).

b. Remove the mast adapter from the top of the mast as follows:

(1) Unscrew the protective cap (fig. 6) from the mast adapter.

(2) Remove the six fillister-head screws that secure the mast adapter, retaining plate, and upper guy ring to the top collar.

(3) Pull the mast adapter from the top of the mast.

c. Couple the mast adapter to the vertical support (fig. 36).

d. Lay the vertical support and mast adapter on a bench with the flatted portion of the mast adapter upward.

e. Insert the threaded end of the alinement tool into the mounting hole adjacent to the positioning hole and secure it in place with the nut.

f. Place one 4-inch level on the flatted portion of the mast adapter.

g. Turn the mounting plate so that the alinement tool points toward the N on the side of the potentiometer housing (fig. 36).

h. Place another 4-inch level on the upper side of the mounting plate.

i. Turn the mast adapter and the mounting plate until they are both exactly level.

j. Place a pencil mark on the base, directly in line with the tip of the alinement tool.

Caution: This mark must be accurately placed to properly realine the potentiometer during assembly.

k. Place a permanent mark on the base with a center punch.

76. Removal of Sine-Cosine Potentiometer

a. Remove the screws that secure the base (fig. 37) to the vertical support housing.

b. Carefully pull the potentiometer and vertical shaft from the vertical support housing. Be careful not to break any of the wires connected between the potentiometer and the cable receptacle.

c. Loosen the setscrews that secure the coupling to the potentiometer shaft.

d. Remove the screw from each potentiometer mounting bracket and slide the potentiometer out of the base and coupling.

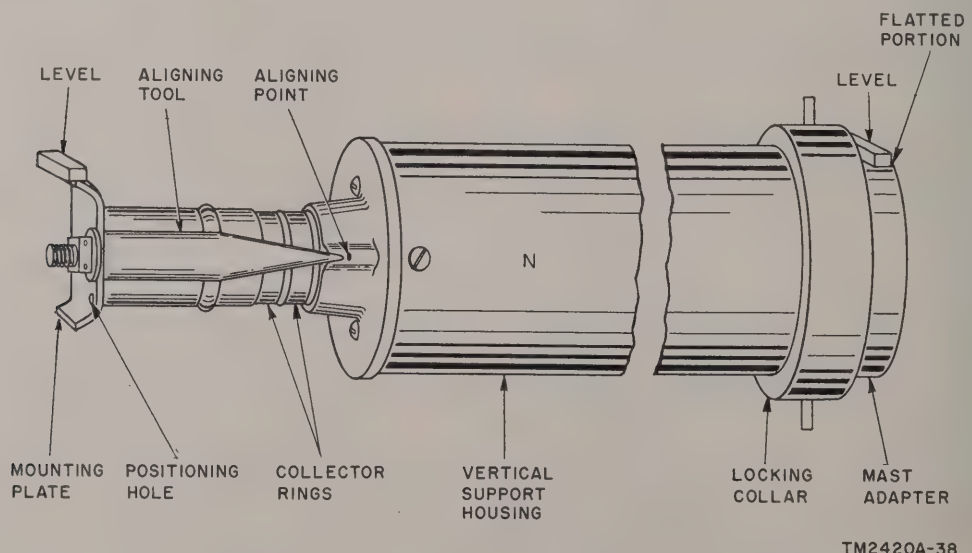


Figure 36. Sine-cosine potentiometer alining point, location diagram.

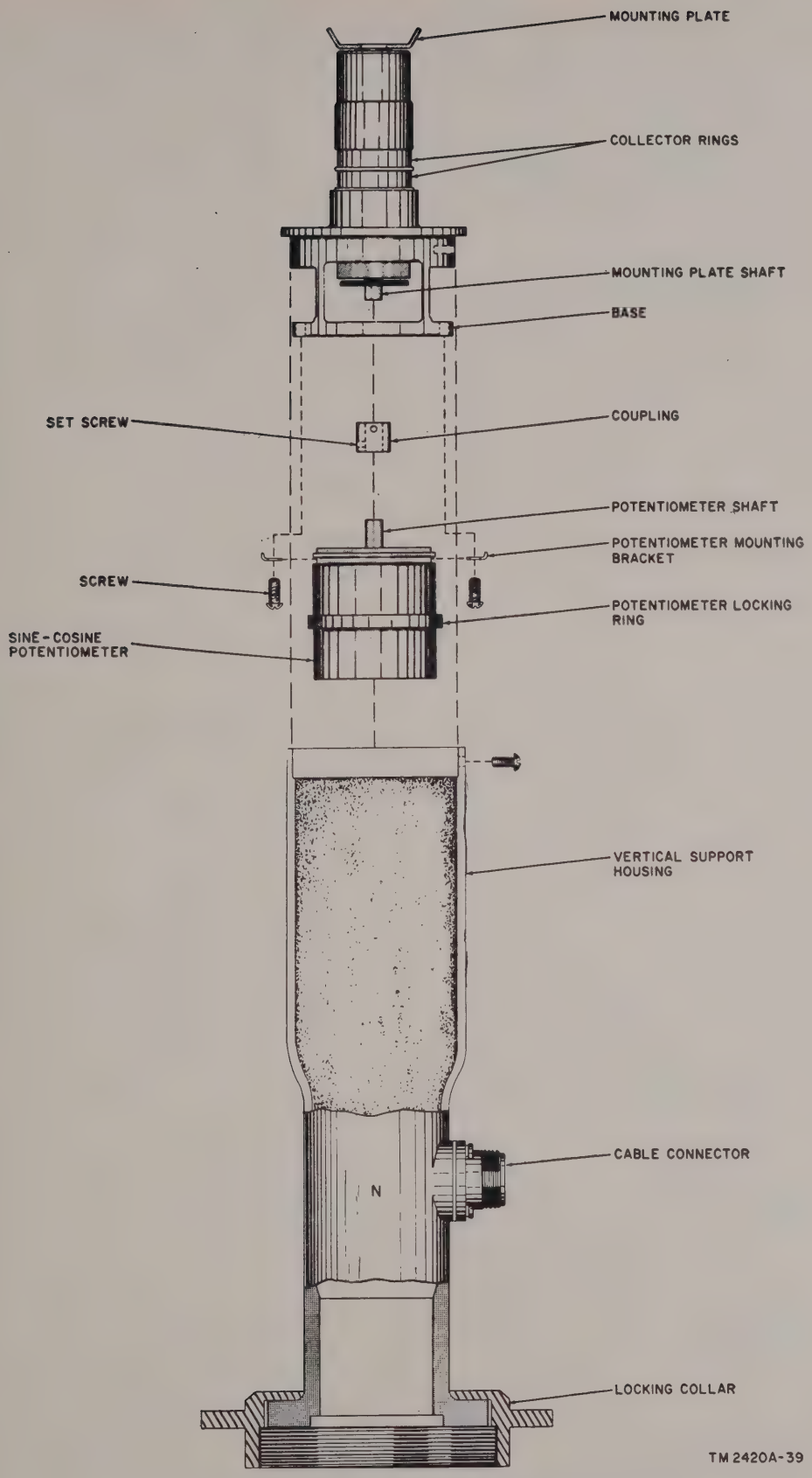


Figure 37. Sine-cosine potentiometer, disassembly diagram.

e. Tag and disconnect the potentiometer leads at the splices.

77. Phasing Sine-Cosine Potentiometer

a. Checking for Correct Phasing.

(1) Arrange an ohmmeter to indicate on the Rx1 range and connect it between the silver wire and the common wires on the upper potentiometer.

(2) Arrange another ohmmeter to indicate on the Rx100 range and connect it between the silver wire and the common wires on the lower potentiometer.

(3) *Slowly* rotate the sine-cosine potentiometer shaft until the ohmmeter connected to the upper potentiometer indicates as near zero (less than 3 ohms) as possible. The ohmmeter connected to the lower potentiometer should indicate 2,375 ±5% ohms.

Note. If the proper ohmmeter indications are not obtained follow the procedures in *b* below.

b. Adjusting Phasing.

(1) Loosen the screw on the clamping band.

(2) Check the position of the sine-cosine poentiometer shaft to be sure the ohmmeter connected to the upper potentiometer still indicates as near zero as possible (less than 3 ohms).

(3) While holding the sine-cosine potentiometer shaft and the upper potentiometer, *slowly* rotate the lower potentiometer until the ohmmeter connected to the lower potentiometer indicates as high as possible (2,375 ±5% ohms).

Note. Do not allow the indication on the ohmmeter connected to the upper potentiometer to change while adjusting the lower potentiometer.

(4) Tighten the clamping band to secure the upper and lower potentiometers in their proper positions. Remove the ohmmeters.

78. Installing Sine-Cosine Potentiometer

Before installing a new potentiometer check it for proper phasing (par. 77).

a. Slide the potentiometer shaft into the coupling and tighten the setscrew.

b. Replace the potentiometer mounting bracket and screws. *Do not tighten the screws.*

c. Arrange an ohmmeter to indicate on the Rx1 range and connect it between the silver wire and the common wire on the upper potentiometer (fig. 38).

d. Position the mounting plate so the alinement tool points directly to the alinement point (fig. 36).

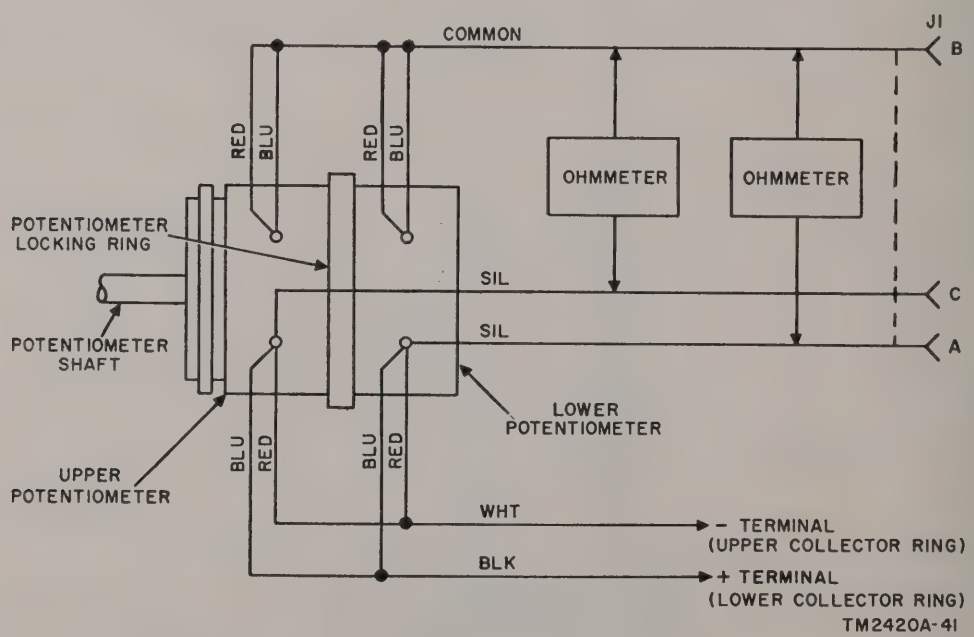


Figure 38. Sine-cosine potentiometer, phasing diagram.

e. Hold the mounting plate with one hand and turn the potentiometer body with the other hand until the ohmmeter reads as near zero as possible (less than 3 ohms).

f. Tighten the screws in the mounting bracket (fig. 37). Be careful not to move the potentiometer while tightening the screws.

g. Connect the new potentiometer wiring (fig. 38) to the wiring in the vertical support housing and vertical shaft.

h. Slide the potentiometer and vertical shaft into the vertical support housing. Be sure that the alinement point (fig. 36) is positioned on the same side as the N on the vertical support housing.

i. Aline the screw holes and replace the screws that secure the base to the vertical support housing.

j. Replace the vertical support on the wind speed transmitter (par. 48*e*).

Section VI. REPLACEMENT OF PARTS, TRAILER MOUNTED MAST AB–328A/M

79. Control Box, Replacement of Parts

To replace any components within the control box, loosen the four cam locks on the front panel. Let the panel hang in front of the box. Remove the defective component and replace it with a new one.

80. Ac Motor Replacement

a. Open the cover on the motor and pump box (fig. 21).

b. Remove the cover plate of the ac electrical box. Tag and disconnect the wiring to the motor and pull the wires from the box.

c. Remove the four ac pump mounting bolts (fig. 39).

d. Remove the four motor support base bolts.

e. Lift the rear of the motor and slide it away from the pump. Do not loosen the screws in the coupling. The coupling will slide free when the motor is slid away from the pump.

f. Lift the motor and motor support base out of the motor and pump box. Do not loosen or disconnect any of the pipes connected to the pump. The pump will be suspended from the pipes until the motor is replaced.

g. Remove the four shock mount bolts.

h. Remove the ac motor by reversing the instructions in *a* through *f* above.

81. Dc Motor Replacement

a. Open the cover on the motor and pump box (fig. 21).

b. Tag and disconnect the wires connected between the dc motor and relay K1.

c. Remove relay K1 and the mounting bracket from the motor support base and lay it aside with the wires attached. Be careful not to break the other wires connected to the switch.

d. Remove the four oil pump mounting bolts that secure the oil pump to the support bracket (fig. 40).

e. Loosen the Allen head setscrew in the coupling nearest the dc motor.

f. Remove the four motor support base bolts.

g. Lift the dc motor and base from the motor and pump box.

h. Remove the bolts from the motor mounting bracket.

i. Install a new motor by reversing the procedures in *a* through *h* above.

82. Ac or Dc Pump Replacement

a. Open the cover on the motor and pump box (fig. 21).

b. Uncouple the pipe unions on the exterior of the motor and pump box (fig. 39 or 40).

c. Loosen the packing gland nut and the packing seal, at the top of the motor and pump box, from the two short pipes.

d. Remove the two short pipes from the pump.

e. Remove the ac motor and pump assembly (par. 80*b*, *c*, and *d*) or the dc motor and pump assembly (par. 81*b*, *c*, *d*, and *f*).

f. Reverse the instructions in *a* through *e* above to install the pump and motor assembly.

Caution: Be sure to coat the threads with pipe thread compound to prevent oil leaks when reassembling. Be sure that the packing gland nut is tight after the pump has been installed.

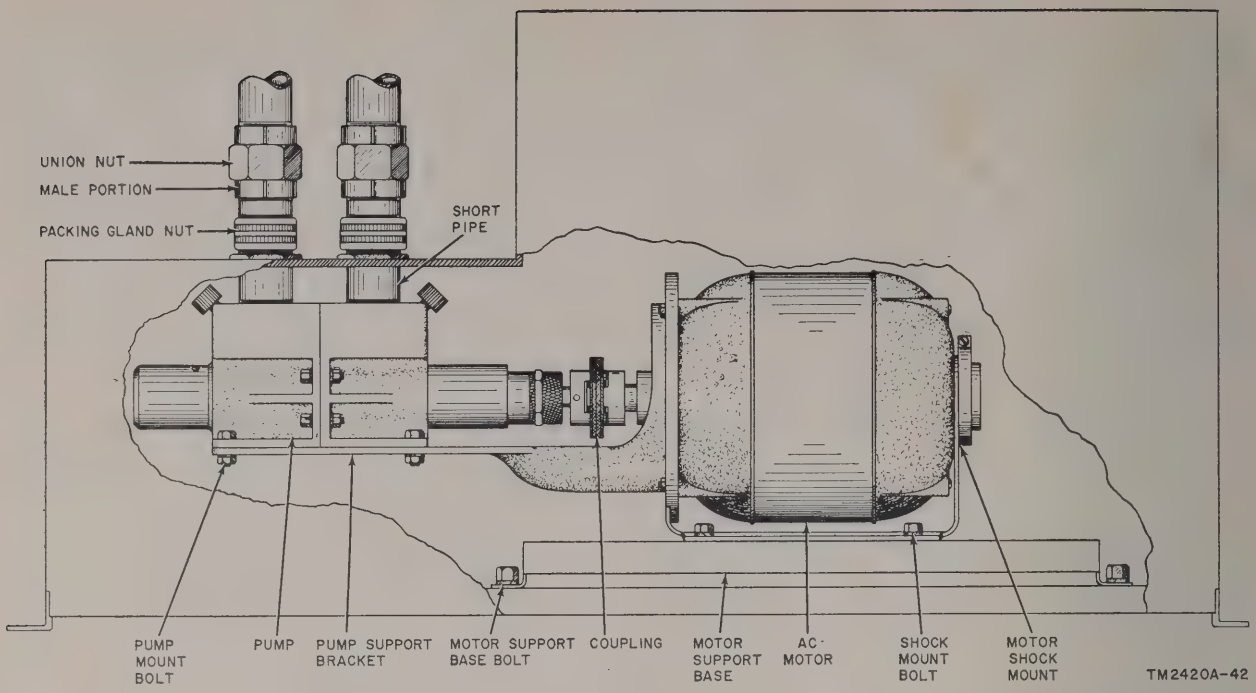


Figure 39. Ac motor and pump mounting, side view.

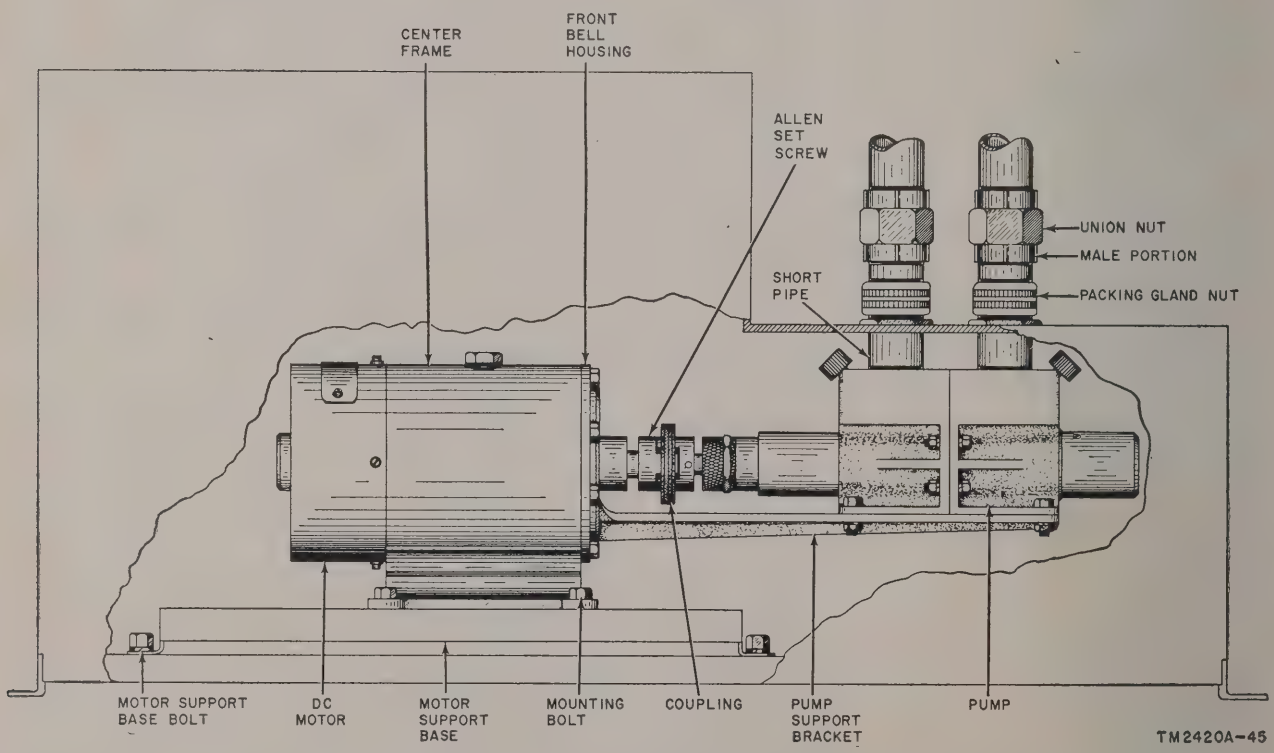
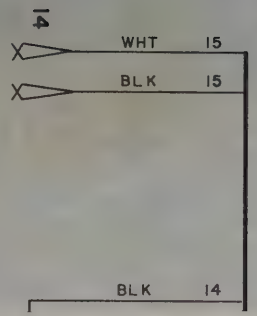
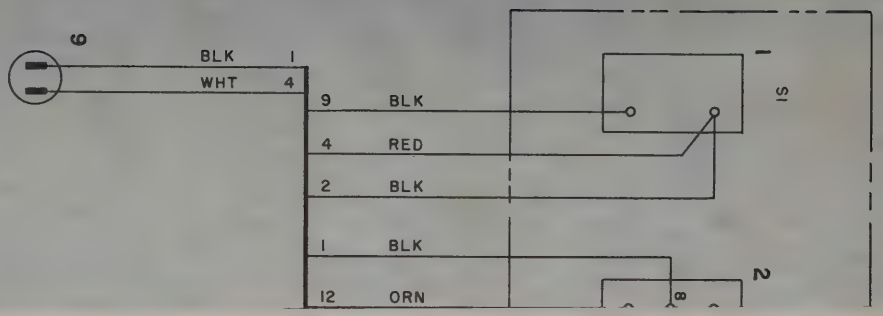


Figure 40. Dc motor and pump mounting, side view.


14
WHT 15
BLK 15
BLK 14


6
BLK 1
WHT 4
9 BLK
4 RED
2 BLK
1 BLK
12 ORN
S1
1
2

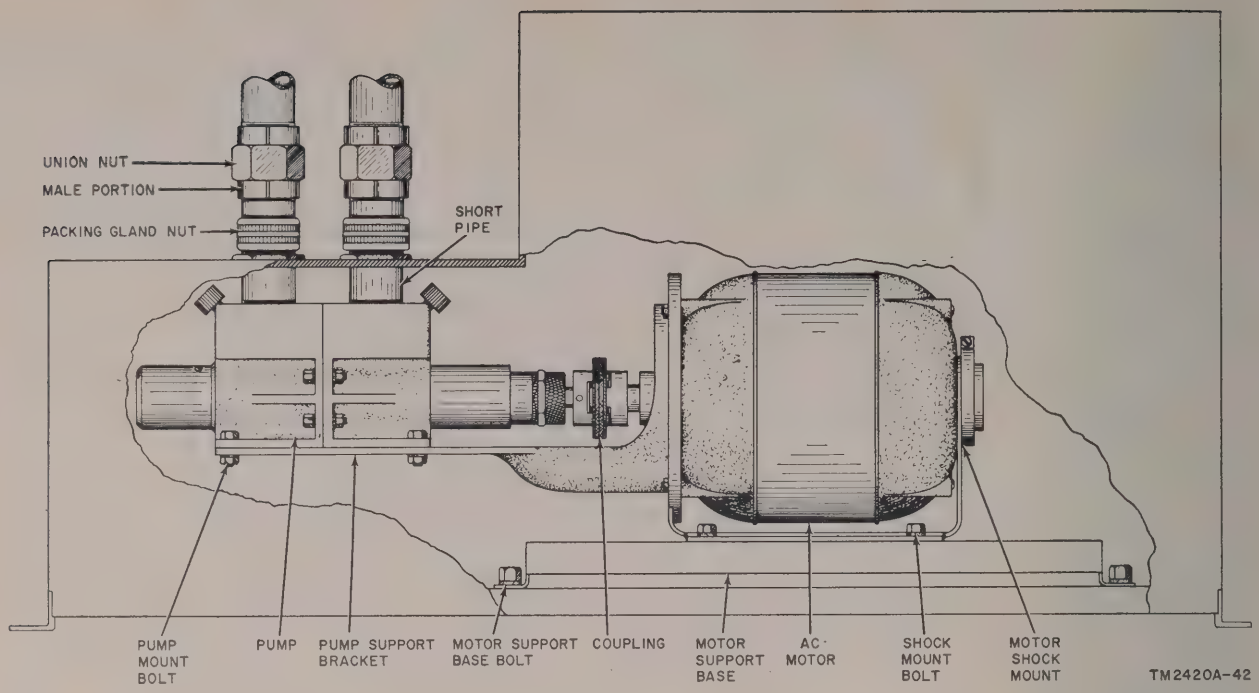


Figure 39. Ac motor and pump mounting, side view.

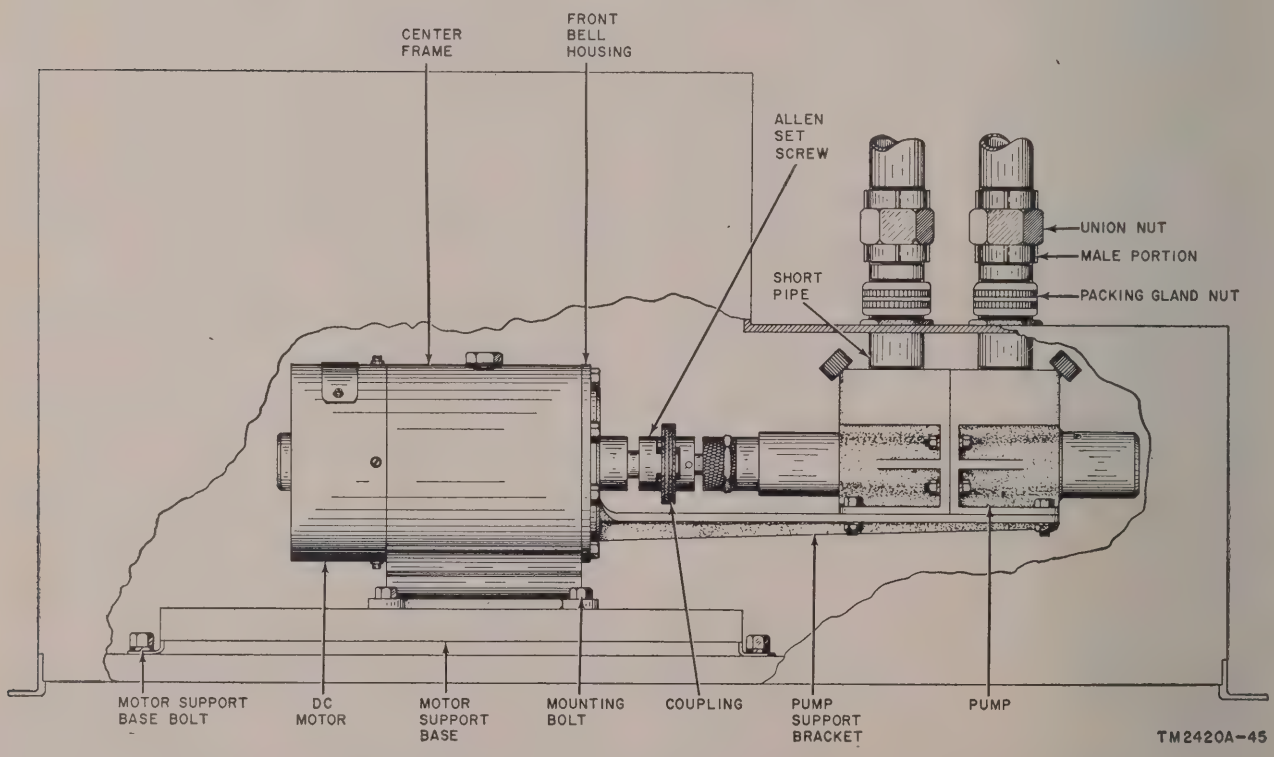


Figure 40. Dc motor and pump mounting, side view.

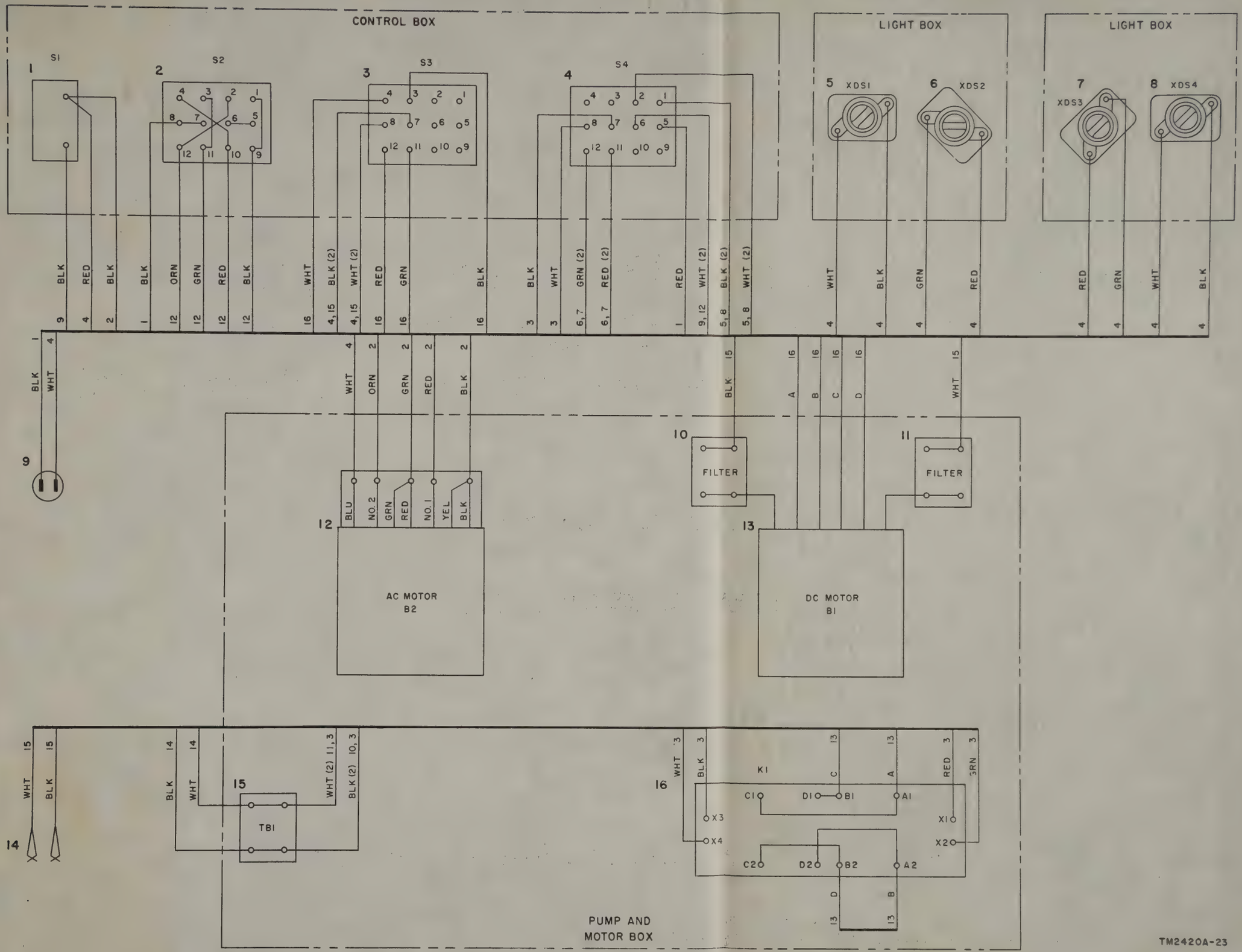
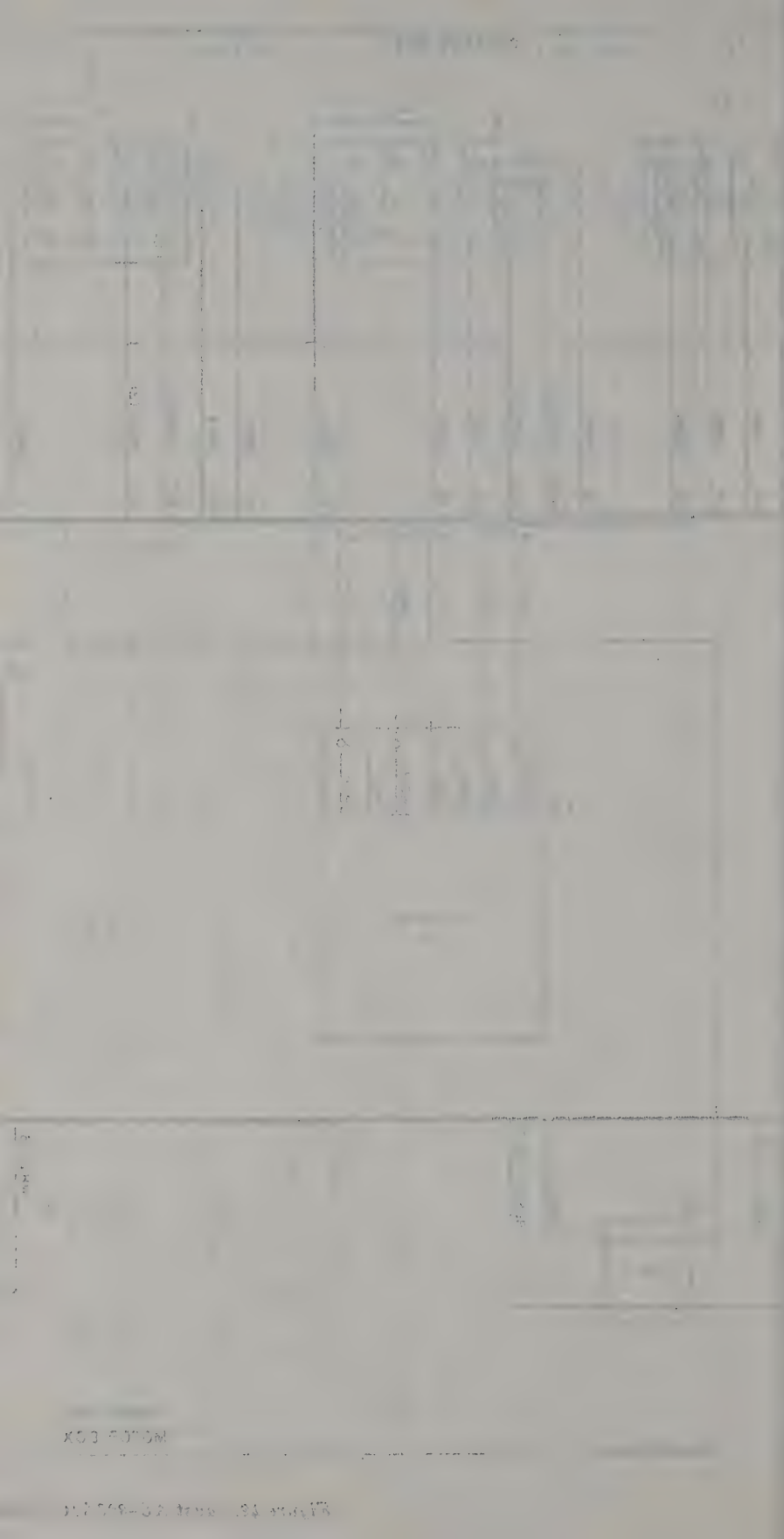
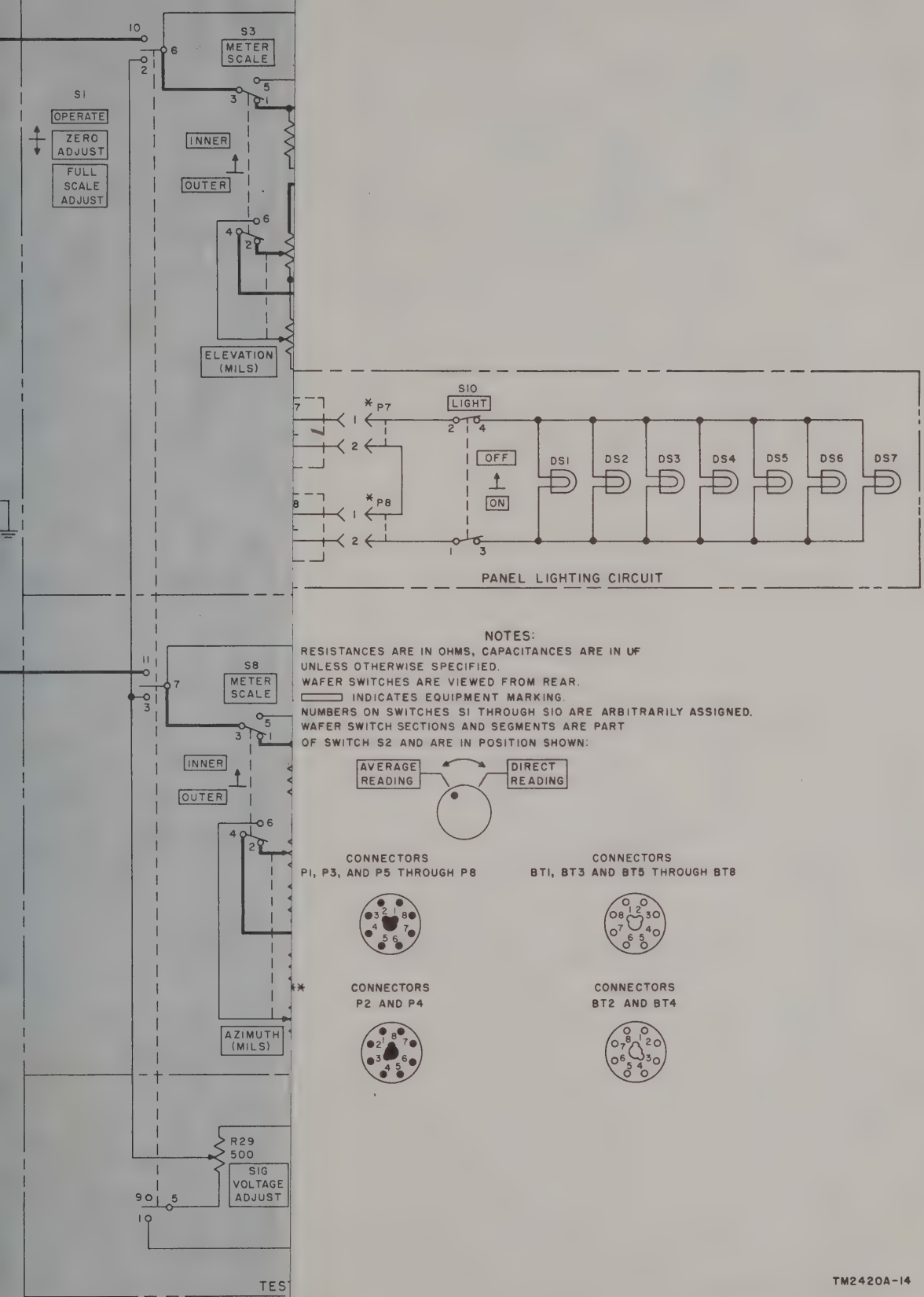


Figure 42. Mast AB–329A/G, wiring diagram.





NOTES:

RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF UNLESS OTHERWISE SPECIFIED.

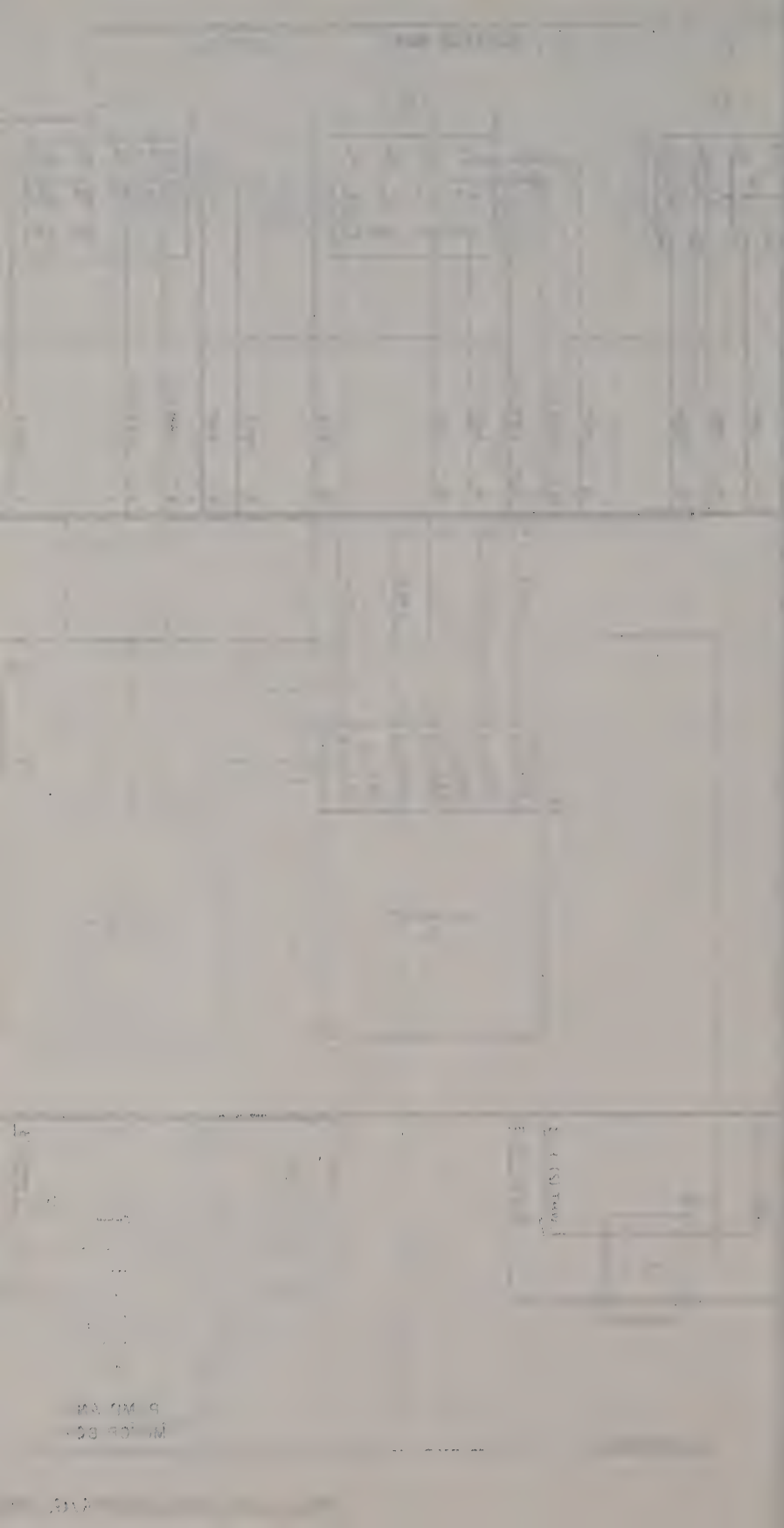
WAFER SWITCHES ARE VIEWED FROM REAR.

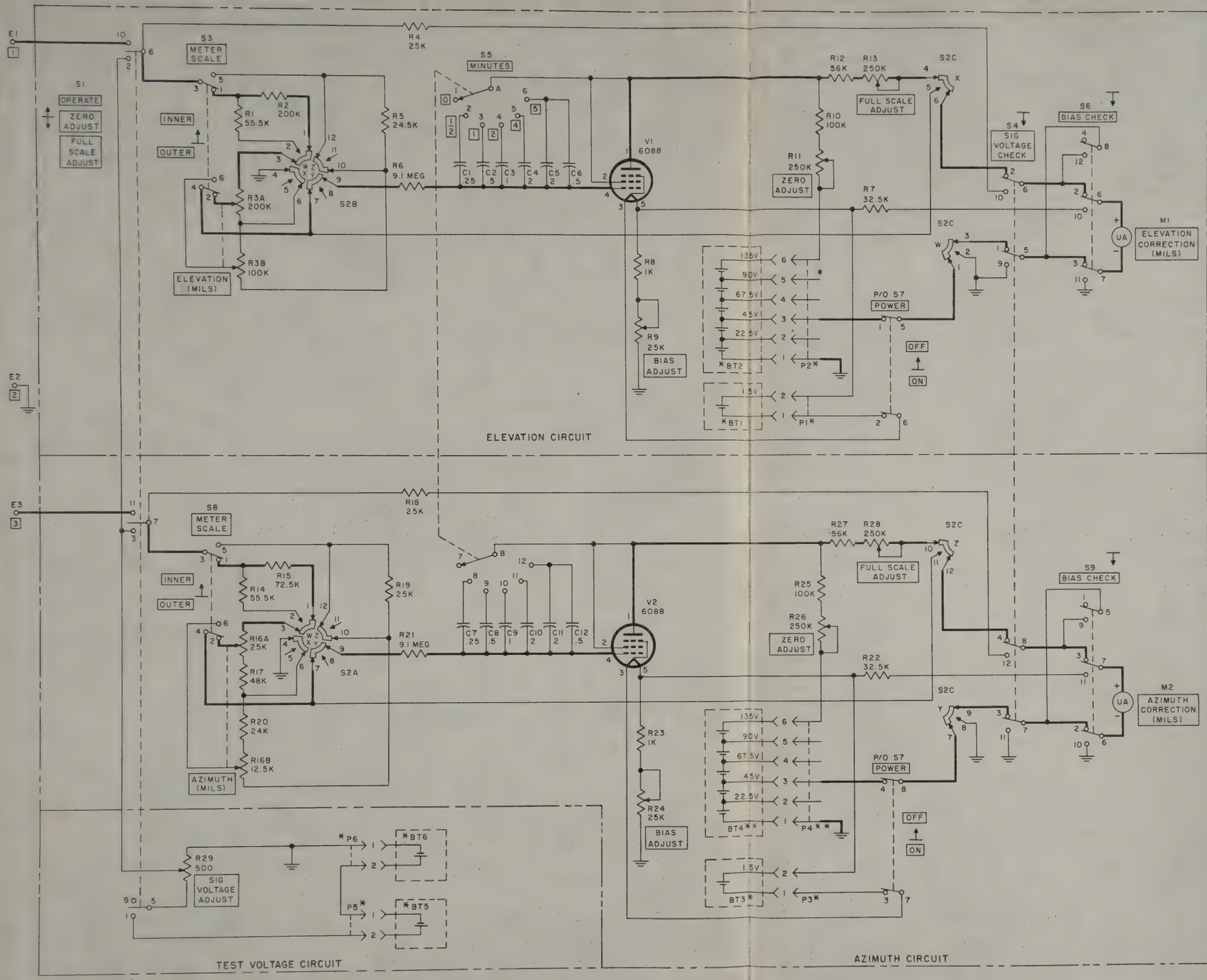
▭ INDICATES EQUIPMENT MARKING.

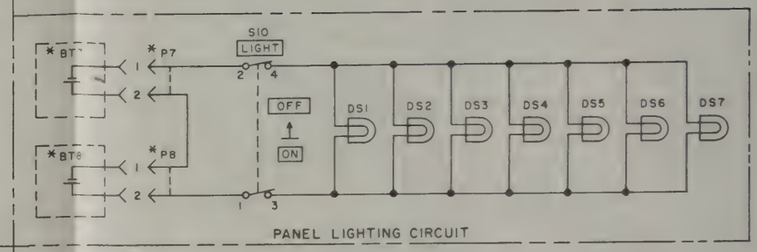
NUMBERS ON SWITCHES S1 THROUGH S10 ARE ARBITRARILY ASSIGNED.

WAFER SWITCH SECTIONS AND SEGMENTS ARE PART OF SWITCH S2 AND ARE IN POSITION SHOWN:

TM2420A-14

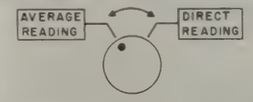






NOTES:

1. RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF UNLESS OTHERWISE SPECIFIED.
2. WAFER SWITCHES ARE VIEWED FROM REAR.
3. ▭ INDICATES EQUIPMENT MARKING.
4. NUMBERS ON SWITCHES S1 THROUGH S10 ARE ARBITRARILY ASSIGNED.
5. WAFER SWITCH SECTIONS AND SEGMENTS ARE PART OF SWITCH S2 AND ARE IN POSITION SHOWN:



* CONNECTORS P1, P3, AND P5 THROUGH P8

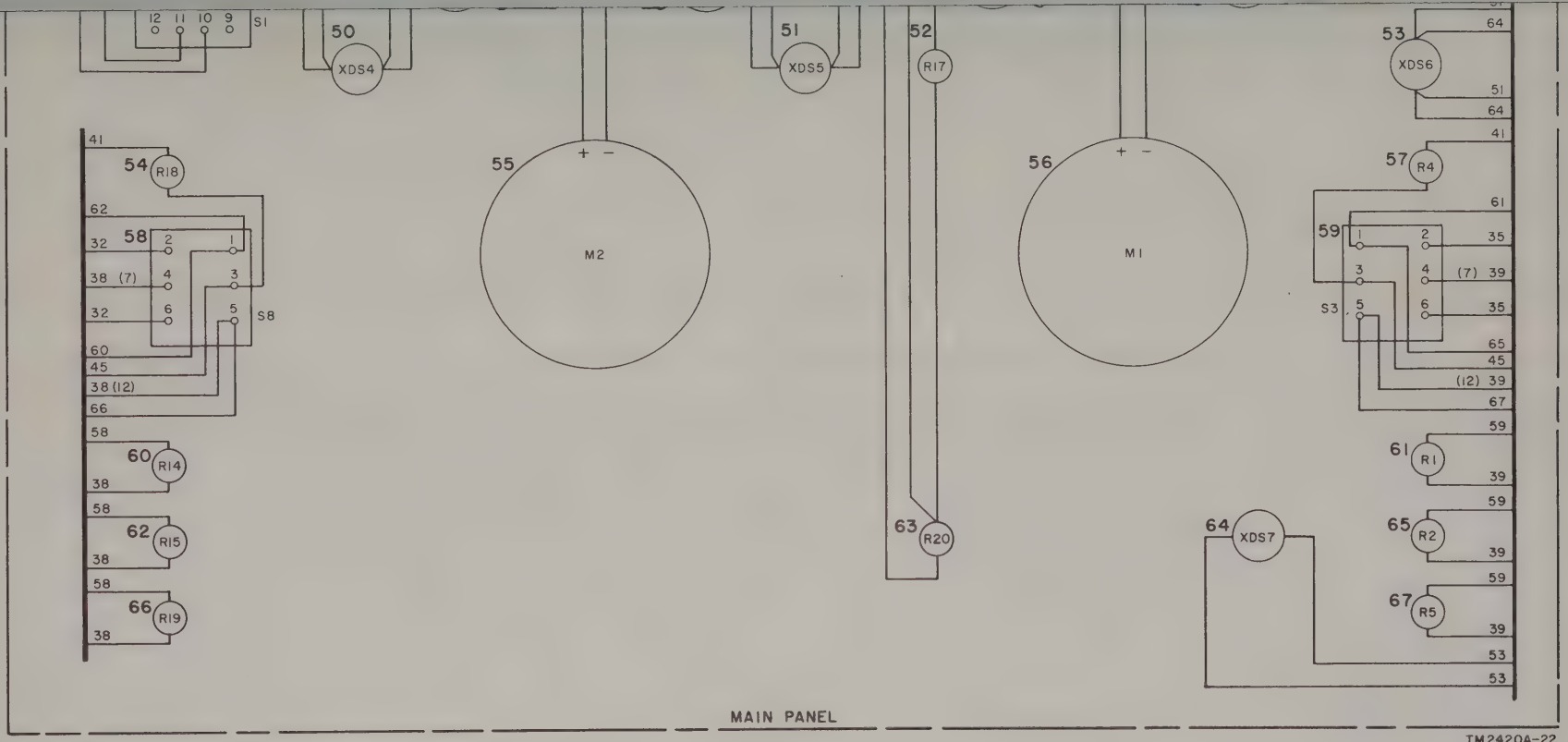
CONNECTORS BT1, BT3 AND BT5 THROUGH BT8

** CONNECTORS P2 AND P4

CONNECTORS BT2 AND BT4

TM2420A-14

Figure 43. Azimuth and Elevation Correction Data Indicator ID–415/MMQ–1, schematic diagram.


12 11 10 9
S1
50
XDS4
51
XDS5
52
R17
53
XDS6
64
51
64
41
54
R18
62
32
58
2
1
38 (7)
4
3
32
6
5
S8
60
45
38 (12)
66
58
60
R14
38
58
62
R15
38
58
66
R19
38
55
+ −
M2
56
+ −
M1
63
R20
57
R4
61
59
2
35
3
4
(7) 39
S3
5
6
35
65
45
(12) 39
67
59
61
R1
39
59
65
R2
39
59
67
R5
39
53
64
XDS7
53
MAIN PANEL

TM2420A-22

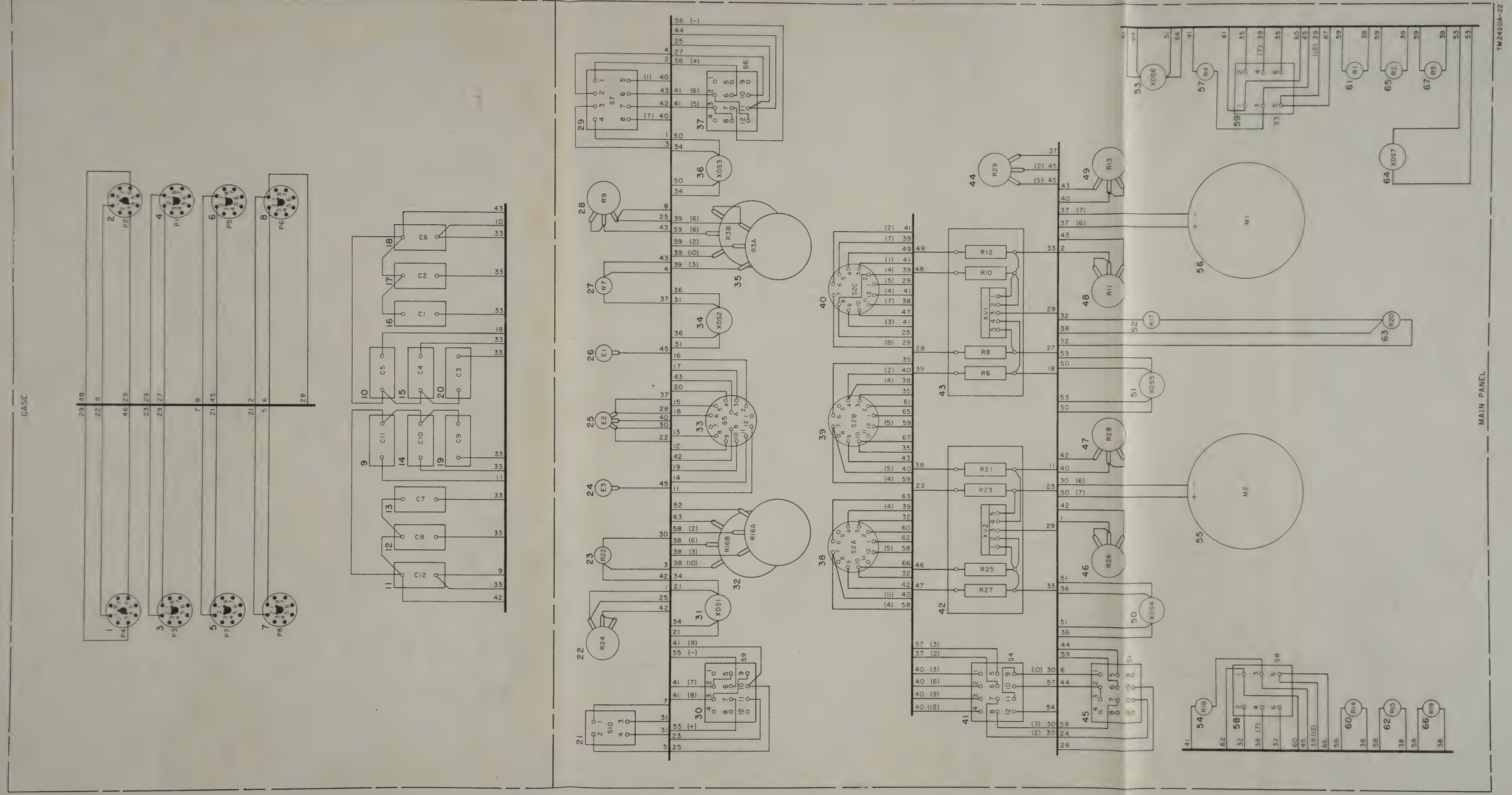


Figure 44. Azimuth and Elevation Correction Data Indicator ID415A/MMQ–1, wiring diagram.

83. Mast Pressure Relief Valve and Pressure Relief Valve Adjustment

a. Disconnect the oil hose from the oil hose fitting (fig. 22).

b. Connect the oil pressure gage to the oil hose (fig. 41).

c. Prepare the equipment for dc operation (par. 19).

Note. Ac operation may be used.

d. Open the oil tank vent valve (green).

e. Open the oil control valve (yellow).

f. Operate the PUMP 24V D.C. switch to the UP position.

g. Check the pressure indication on the oil pressure gage. It should indicate 60 psi.

h. If the oil pressure gage does not indicate 60 psi, adjust the pressure relief valve as follows:

(1) Remove the cap from the pressure relief valve.

(2) Loosen the hexagonal lock nut.

(3) Adjust the pressure relief valve until the oil pressure gage indicates 60 psi. Turn the adjusting screw clockwise to increase the oil pressure; turn it counterclockwise to decrease the oil pressure.

(4) Hold the adjusting screw and tighten the hexagonal lock nut. Replace the cap.

i. Interchange the mast pressure relief valve with the pressure relief valve. Repeat the procedures in *a* through *h* above.

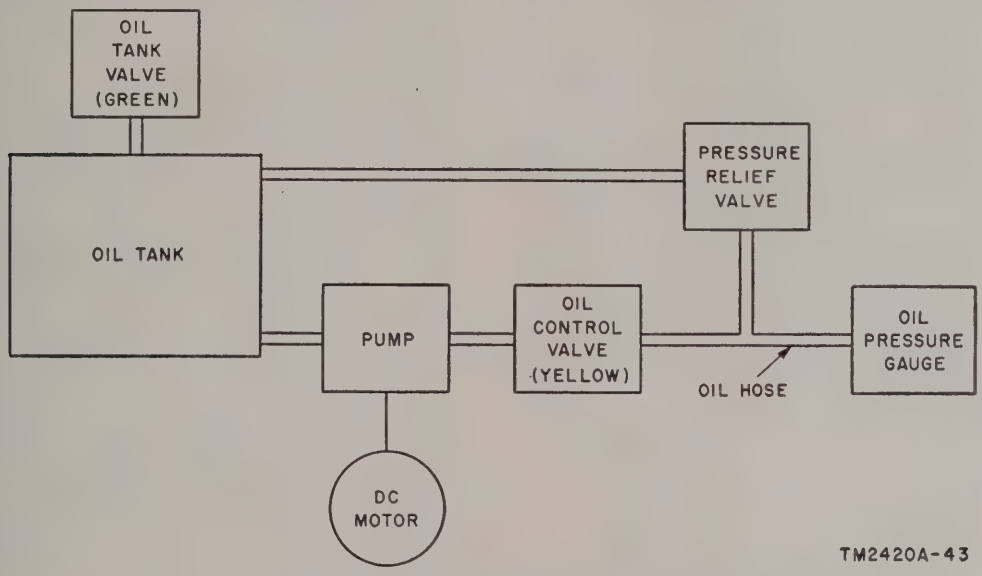


Figure 41. Pressure relief valve test setup.

Section VII. FINAL TESTING

84. Purpose

Equipment that has been repaired must meet definite minimum performance standards before it is returned to service. The tests outlined in paragraphs 85 through 89 are designed to measure the performance capability of a repaired Wind Measuring Set AN/MMQ–1A. Equipment that meets the minimum standards stated in the tests will furnish satisfactory operation.

85. Test Equipment Required for Final Testing

The test equipment required for final testing is the same as that listed for troubleshooting (par. 62*b*). Refer to the appropriate technical manuals for instructions on the use of the test equipment.

86. Indicator Azimuth Circuit

a. Direct Reading Inner Scale.

(1) Connect a 1.5-volt dc source to terminals 2 and 3 on the indicator.

(2) Operate the AVERAGE READING-DIRECT READING switch to the DIRECT READING position.

(3) Operate the METER SCALE switch to the INNER position.

(4) Operate the AZIMUTH (MILS) control to the settings indicated below; the associated azimuth meter indications should be obtained.

AZIMUTH (MILS) control settings	*Azimuth meter indication (±3.7 mils)*
200	103
500	111
800	135
888	142.5

b. Average Reading Inner Scale.

(1) Operate the POWER switch to the ON position. Allow the indicator to warm up for 3 minutes.

(2) Operate the AVERAGE READING-DIRECT READING switch to the AVERAGE READING position.

(3) Repeat the procedure in *a*(4) above.

(4) Disconnect the 1.5-volt dc source from the indicator.

c. Direct Reading Outer Scale.

(1) Connect a 3-volt dc source to terminal 2 and 3 of the indicator.

(2) Operate the AVERAGE READING-DIRECT READING switch to the DIRECT READING position.

(3) Operate the METER SCALE switch to the OUTER position.

(4) Operate the AZIMUTH (MILS) control to the settings indicated below; the associated azimuth meter indications should be obtained.

AZIMUTH (MILS) control settings	*Azimuth meter indications (±5.7 mils)*
200	206
500	222
800	270
888	285

d. Average Reading Outer Scale.

(1) Operate the AVERAGE READING-DIRECT READING switch to the AVERAGE READING position.

(2) Repeat the procedure in *c*(4) above.

e. Azimuth Meter Dampening Circuit. Perform the action or condition given for item 56 of the equipment performance check list (par. 45).

87. Indicator Elevation Circuit

a. Direct Reading Inner Scale.

(1) Connect a 1.5-volt dc source to terminals 1 and 2 on the indicator.

(2) Operate the AVERAGE READING-DIRECT READING switch to the DIRECT READING position.

(3) Operate the METER SCALE switch to the INNER position.

(4) Operate the ELEVATION (MILS) control to the settings indicated below; the associated elevation meter indications should be obtained.

ELEVATION (MILS) control settings	*Elevation meter indication (±1.5 mils)*
200	19
500	49
800	71
888	75

b. Average Reading Inner Scale.

(1) Operate the POWER switch to the ON position. Allow the indicator to warm up for 3 minutes.

(2) Operate the AVERAGE READING-DIRECT READING switch to the AVERAGE READING position.

(3) Repeat the procedure in *a*(4) above.

(4) Disconnect the 1.5-volt dc source from the indicator.

c. Direct Reading Outer Scale.

(1) Connect a 3-volt dc source to terminals 1 and 3 of the indicator.

(2) Operate the AVERAGE READING-DIRECT READING switch to the DIRECT READING position.

(3) Operate the METER SCALE switch to the OUTER position.

(4) Operate the ELEVATION (MILS) control to the settings indicated below; the associated elevation meter indication should be obtained.

ELEVATION (MILS) control settings	*Elevation meter indication (±3 mils)*
200	38
500	98
800	142
888	150

d. Average Reading Outer Scale.

(1) Operate the AVERAGE READING-DIRECT READING switch to the AVERAGE READING position.

(2) Repeat the procedure in *c*(4) above.

e. Elevation Meter Dampening Circuit. Perform the action or condition given for item 56 of the equipment performance check list (par. 45).

88. Wind Measuring Set AN/MMQ–1A, Immersion Test

a. Prepare the AN/MMQ–1A for the immersion test according to the procedure explained in

paragraph 35. Be sure that all containers are closed and latched securely.

b. Tow the trailer into a pool of water deep enough to cover the uppermost part of the equipment with 2 feet of water. Allow the trailer to remain in the water for 30 minutes.

c. Tow the trailer out of the pool and check the waterproof containers as follows:

(1) All containers with latched covers should be completely dry.

(2) The PE–75–AF container should have a maximum of 2 inches of water in the bottom of the pan.

89. Wind Measuring Set AN/MMQ–1A, Final Checks

a. Operational Checks.

(1) Set the trailer up for operation (par. 13).

(2) Install the wind speed transmitter (par. 14) and connect one end of the signal transmission cable.

(3) Raise the mast to the upright position (par. 15), and connect the other end of the signal transmission cable.

(4) Level the trailer (par. 16).

(5) Rotate the mast through 360° (par. 17).

(6) Connect the dc power cable to the battery in the towing vehicle (par. 19*a*).

(7) Connect short lengths of field wire between terminals 1, 2, and 3 of the terminal box on the outside of the trailer and the indicator.

(8) Prepare Power Unit PE–75–AF for operation (par. 21).

(9) Perform the preoperational check and procedures (par. 27).

(10) Calibrate and prepare the indicator for operation (par. 31).

(11) Extend and retract the mast; use dc power (par. 28*a*).

(12) Extend the mast; use ac power (29*a* and *b*).

(13) Perform the following checks while the mast is extended:

(*a*) Check for oil leaks at all mast section joints.

(*b*) Check each mast section for dents or damage that may affect its operation.

(*c*) Check all oil hoses for cuts, breaks, cracks, or leaks.

(*d*) Check the indicator for azimuth and elevation meter indications in accordance with existing wind direction and speed.

(14) Retract the mast; use ac power (par. 29*c*).

(15) Lay the mast down and prepare the AN/MMQ–1A for removal (par. 32).

b. Wind Speed Transmitter.

(1) Check the wind speed transmitter for excessive friction (par. 41). This check can be made with the wind speed transmitter mounted on the mast if the trailer is protected from the wind.

(2) Check the wind speed transmitter for proper balance by rotating it to several positions on the mast and releasing it. The wind speed transmitter should not move when it is released.

CHAPTER 7
DEMOLITION TO PREVENT ENEMY USE

Note. The wind measuring set is prepared for shipment and limited storage when not in use (par. 32).

90. General

The demolition procedures outlined in paragraph 91 will be used to prevent the enemy from using or salvaging this equipment. Demolition of this equipment will be accomplished only upon orders from the commander.

91. Methods of Destruction

a. Smash. Smash the wind speed transmitter, indicator, mast, oil pump, oil pump motor, oil tank, power unit, mil scale, levels, etc; use sledges, axes, pickaxes, hammers, crowbars, or other heavy tools.

b. Cut. Cut all wires, cables, hose, etc; use axes, handaxes, or machetes.

c. Burn. Burn all wooden and paper items; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. Bend. Bend mil scale, mil scale pointer, wind speed transmitter, mast sections, etc.

e. Explode. If explosives are necessary, use firearms, grenades, or TNT.

f. Dispose. Bury or scatter the destroyed parts in slit trenches, fox holes or other holes, or throw them into streams.

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[AG 413.6 (31 Jul 56)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

JOHN A. KLEIN,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

CNGB (1)
ASA (3)
Tec Svc, DA (1) except CSIGO (30)
Tec Svc Bd (1)
Hq CONARC (5)
CONARC Bd (Incl ea Test Sec) (1)
Army AA Comd (2)
OS Maj Comd (5)
OS Base Comd (5)
Log Comd (5)
MDW (1)
Armies (5)
Corps (2)
Ft & Cp (2)
Sp Wpn Comd (2)
Army Cml Cen (4)
Gen & Br Svc Sch (5) except Sig Sch (25)
Gen Depots (2) except Atlanta Gen Depot (None)
Sig Sec, Gen Depots (10)
Sig Depots (17)
US Army Tng Cen (2)
POE (OS) (2)
Trans Terminal Comd (2)
Army Terminals (2)
OS Sup Agencies (2)
Army Elct PG (1)
Sig Fld Maint Shops (3)
Sig Lab (5)
ACS (3)
Mil Dist (1)
Units org under fol TOE:
6–525C, FA Rkt Bn, 762-mm Rkt, Self-Propelled (2) 11–7C, Sig Co, Inf Div (2)
11–16C, Hq&Hq Co, Sig Bn, Corps or Abn Corps (2)
11–57C, Armd Sig Co (2)
11–127R, Sig Rep Co (2)
11–128R, Sig Depot Co (2)
11–500R (AA-AE), Sig Svc Org (2)
11–557C, Abn Sig Co (2)
11–587R, Sig Base Maint Co (2)
11–592R, Hq&Hq Co, Sig Base Depot (2)
11–597R, Sig Base Depot Co (2)

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see SR 320–50–1.

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